ORDER NO. VQS0281-4
D5

Panasonic

D-3 1/2" DIGITAL

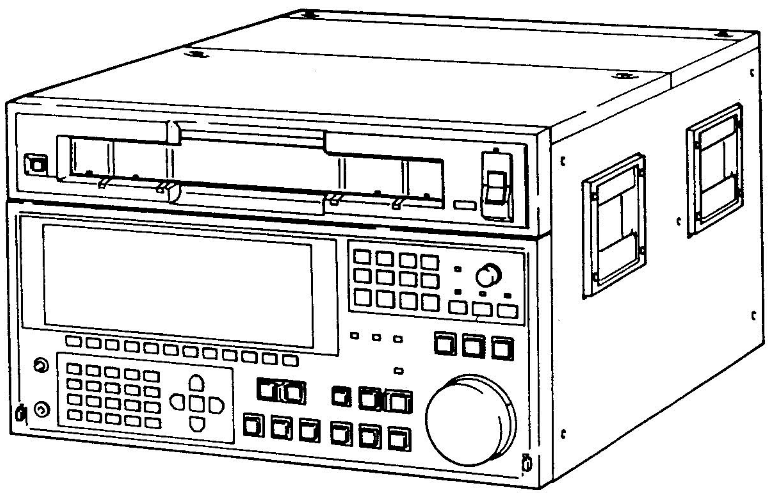
STUDIO VTR

AJ-D350-P/E

NTSC/PAL

Operating Instructions & Service Manual

V. 5–0



Broadcast Systems

FILE NO. VSD9106M001-5

Service Manual

Electrical Adjustments

Panasonic
Broadcast Systems

Electrical Adjustment

NTSC

Panasonic
Broadcast Systems

RECOMMEND TEST AND SERVICE EQUIPMENT

PART No	NAME	REMARK
1910 or TSG170D	DIGITAL COMPOSITE SIGNAL GENERATOR	TEKTRONIX
1410	COMPOSITE SIGNAL GENERATOR	TEKTRONIX
2467B	400MHz OSCILLOSCOPE	TEKTRONIX
1750	SCH METER	TEKTRONIX
520A	VECTOR SCOPE	TEKTRONIX
	DIGITAL VOLT METER	
	FREQUENCY COUNTER	
	VTVM	FREQUENCY BAND WIDE 4Hz ~ 500KHz
	DIGITAL MULTI METER	
	DISTORTION METER	
HP8591A	SPECTRUM ANALYZER	HEWLETT PACKARD
	AUDIO ANALYZER (or RC OSCILLATOR)	
TYPE 5012	DIGITAL AUDIO SIGNAL GENERATOR	PRO-BEL

Note: (1) CF OUT modification is necessary for 1910.
Please contact with TEKTRONIX for this modification.
(2) 1910 digital video out is necessary to use cross cable tool.

How to read a table for adjustment

TEST	Test Points for scope and [Location on the Board]
MODE	Set VTR this mode
TAPE	Alignment Tape portion or work tape
M.EQ	Measurement Equipment
INPUT	Input the signal to VTR specified here
ADJ.	Adjustment portion and [Location on the Board]

1. AUDIO A/D D/A, VIDEO D/A (L1) BOARD [AUDIO SECTION]

1-1. A/D REFERENCE LEVEL ADJUSTMENT

TEST	TP302(CH1)[C2], TP305(CH2)][C3], TP312(CH3)[C5], TP315(CH4)[C7]
MODE	STOP
TAPE	
M.EQ	VTVM
INPUT	1kHz +4dBm Sinewave Signal to AUDIO IN (CH1 to CH4)
ADJ.	VR301(CH1)[B2], VR302(CH2)[B3], VR304(CH4)[B7]

4000 SERIES

<STEP 1>
MACHINE CONDITION

1. INPUT ATT SELECT SW ....+4dBm (on the AUDIO IN/OUT Board)
2. OUTPUT ATT SELECT SW ....+4dBm (on the AUDIO IN/OUT Board)
3. INPUT IMPEDANCE SW .... 600Ω (on the AUDIO IN/OUT Board)

<STEP 2>
MENU CONDITION
AUDIO IN MENU
Eelect the AUDIO INPUT LEVEL to "UNITY"
(CH1 ~ CH4 : F1 ~ F4)

<STEP 3>
1. VTVM : LINE OUT (CH1)
LINE OUT (CH2)
LINE OUT (CH3)
LINE OUT (CH4)
2. Adjustment VR : VR301 (CH1)
VR302 (CH2)
VR303 (CH3)
VR304 (CH4)

SPECIFICATION:
VR301, VR302 : +4dBm ± 0.05dB
VR304, VR303

<STEP 4>
1. VTVM : TP301 (CH1)
TP302 (CH2)
TP303 (CH3)
TP304 (CH4)
2. Confirm that the Audio level is within the specification as shown.

SPECIFICATION : +9.30dBm ± 0.5dB

<STEP 5>
1. VTVM : TP303 (CH1)
TP306 (CH2)
TP313 (CH3)
TP316 (CH4)
2. Confirm that the Audio level is within the specification as shown.

SPECIFICATION : -9.7dBm ± 0.2dB

1-2. AUDIO OUTPUT LEVEL ADJUSTMENT

TEST	LINE OUB: (CH1),(CH2),(CH3),(CH4), (MONI LCH),(MONI RCH)
MODE	STOP
TAPE	
M.EQ	VTVM
INPUT	1kHz +4dBm Sinewave Signal to AUDIO IN
ADJ.	VR601(CH1)[F2], VR602(CH2)[G2], VR603(CH3)[I2], VR604(CH4)[J2], VR605(MONI LCH)[K2], VR606(MONI RCH)[M2]

<STEP 1>
MENU CONDITION
AUDIO IN MENU
Select the AUDIO INPUT
LEVEL to "OFF" : F7

<STEP 2>
1. VTVM : CH1 LINE OUT
CH2 LINE OUT
CH3 LINE OUT
CH4 LINE OUT
MONI LCH OUT
MONI RCH OUT
2. Adjustment VR : VR601 (CH1)
VR602 (CH2)
VR603 (CH3)
VR604 (CH4)
VR605 (MONI LCH)
VR606 (MONI RCH)

(SPECIFICATION)
Each CH Output Level : +4dBm ± 0.5dB

Note: If there is some noise at monitor out, please adjust L601 ~ L602, L201.

1. AUDIO A/D D/A, VIDEO D/A (L1) BOARD [VIDEO SECTION]

MENU CONDITION
VIDEO IN MENU
Select the VIDEO INPUT F3 to "DIGITAL"
VIDEO OUT SET UP MENU
Select the VIDEO STANBY OFF to "EE2"
STANBY OFF
VIDEO : EE2

1-1. VIDEO OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	PULSE & BAR to DIGITAL IN
ADJ.	VR1 (D/A LEVEL)[A8]

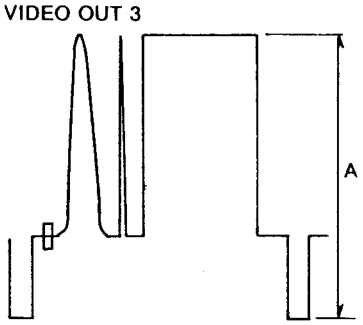
<STEP 1>

1. SCH METER : VIDEO 1 OUT
2. Adjust VR1 so that the Video level "A" is 1V ± 0.002Vp-p as shown in Figure.

<STEP 2>

1. SCH METER : VIDEO 2 OUT
   VIDEO 3 OUT
2. Confirm that the Video level "A" is 1V ± 0.002Vp-p.

VIDEO OUT 1 ⦸ VR1
VIDEO OUT 2
VIDEO OUT 3



SPEC: A=1V±0.002vp-p

1-2. VIDEO OUTPUT FREQUENCY ADJUSTMENT (1) (L1 : VIDEO D/A)

TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL H SWEEP to DIGITAL IN
ADJ.	VR2 [L8]

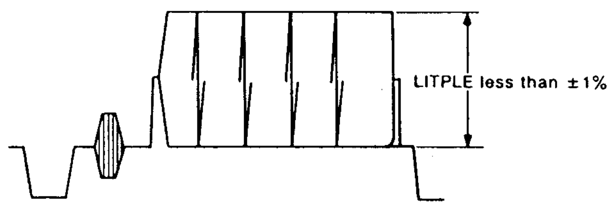
<STEP 1>

1. SCH METER : VIDEO 1 OUT
2. Adjust VR2 so that the Frequency Response is flat as shown in Figure.

<STEP 2>

1. SCH METER : VIDEO 2 OUT
   VIDEO 3 OUT
2. Confirm that the Frequency Response is flat as shown in Figure.

VIDEO 1 OUT ⦸ VR2
VIDEO 2 OUT
VIDEO 3 OUT



SPEC: LITPLE is less than 1%

1-3. VIDEO OUTPUT FREQUENCY ADJUSTMENT (2) (L1 : VIDEO D/A)

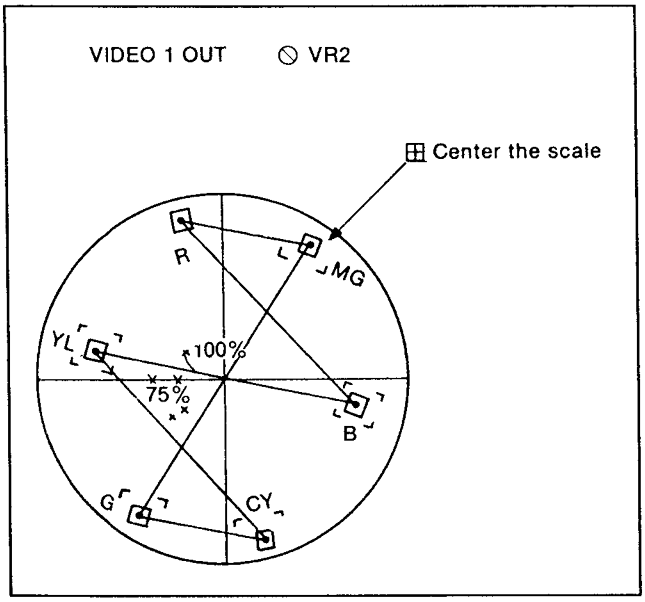
TEST	VIDEO 1 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR2[L8]

<STEP 1>

1. VECTOR SCOPE : VIDEO 1 OUT
2. Adjust VR2 so that the each vector is in center the scale of Vector Scope.

<STEP 2>

1. Confirm that the each vector position is in the box of vector scope when put back the L1 board into the VTR.



1-4. VIDEO OUTPUT DC LEVEL ADJUSTMENT (L1 : VIDEO D/A)

TEST	TP4[J8]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR4(CLAMP DC LEV)[L7]

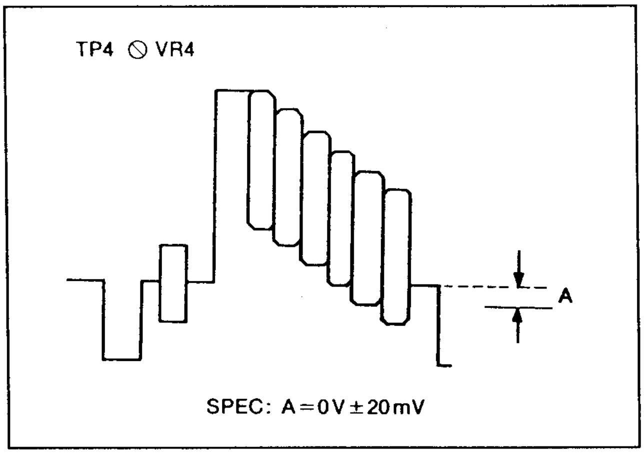
<STEP 1>

MACHINE CONDITION

Connect the 75Ω termination to VIDEO 1 OUT.

<STEP 2>

1. SCOPE : TP4
2. Adjust VR4 so that the Pedestal DC level is 0V ± 20mV as shown in Figure.

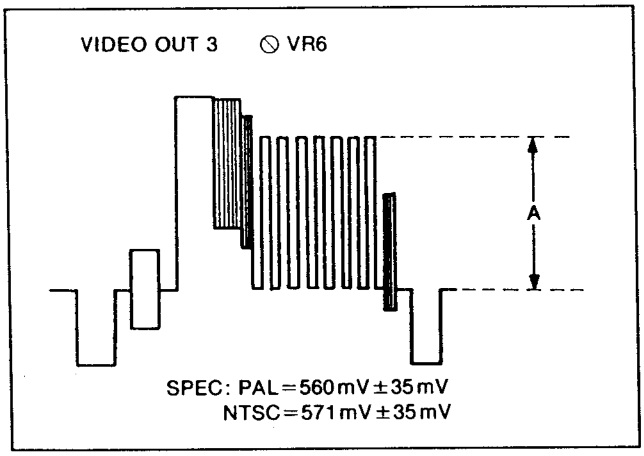


1-5. CHARACTER LEVEL ADJUSTMENT (L1 : VIDEO D/A)

TEST	VIDEO 3 OUT (SUPER)
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGIRAL IN
ADJ.	VR6 (CHAR LEVEL)[J8]

<STEP 1>

1. SCH METER : VIDEO 3 OUT
2. Adjust VR6 so that the Character level "A" is 80IRE ± 5IRE as shown in Figure. NTSC=571mV ± 35mV.



1-6. WFM OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

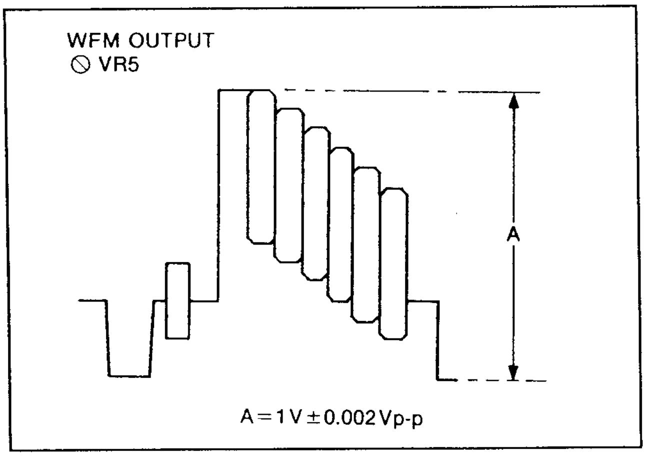
TEST	WFM OUTPUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR5 (RET V LEVEL)[L6]

<STEP 1>

MENU CONDITION
VIDEO OUT MENU : F9
Select the WFM to A INPUT

<STEP 2>

1. SCH METER : WFM OUTPUT
2. Adjust VR5 so that Input level "A" is 1V ± 0.002Vp-p as shown in Figure.



<STEP 3>

MENU CONDITION
VIDEO OUT MENU : F9
Select the WFM to "OUTPUT"

<STEP 4>

1. SCH METER : WFM OUTPUT
2. Confirm that the Output level "A" is 1V ± 0.002Vp-p as shown in Figure.

Refer to above Figure in <STEP 2>

4. VIDEO PROCESS (L4) BOARD

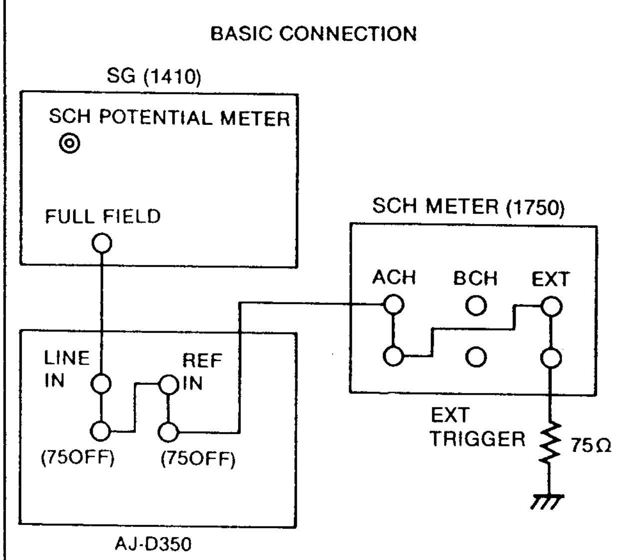
Adjustment with this section, perform after completed adjustment with L1 section.

MENU CONDITION 1

AUDIO IN MENU
Select the VIDEO INPUT F3 to "ANALOG"
VIDEO OUT SET UP MENU
Select the VIDEO STANBY OFF to "EE2"
STANBY OFF
VIDEO : EE2

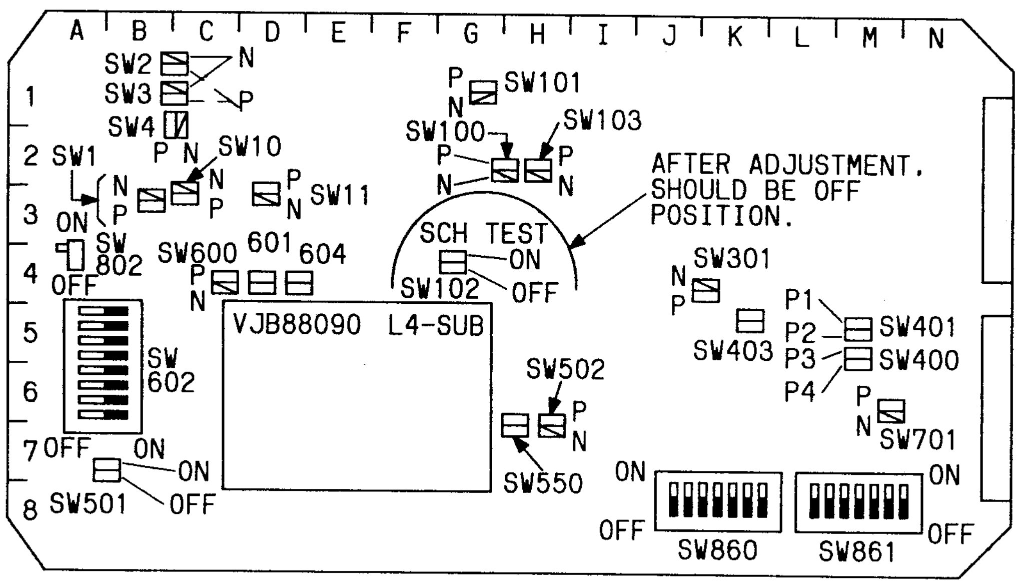
MENU CONDITION 2
TEST MENU
VIDEO FUNCTION
Press the SCH F10 Key on the Front Panel and display the OUT REF SCH METER.

MACHINE CONDITION (SET UP CONDITION 1)



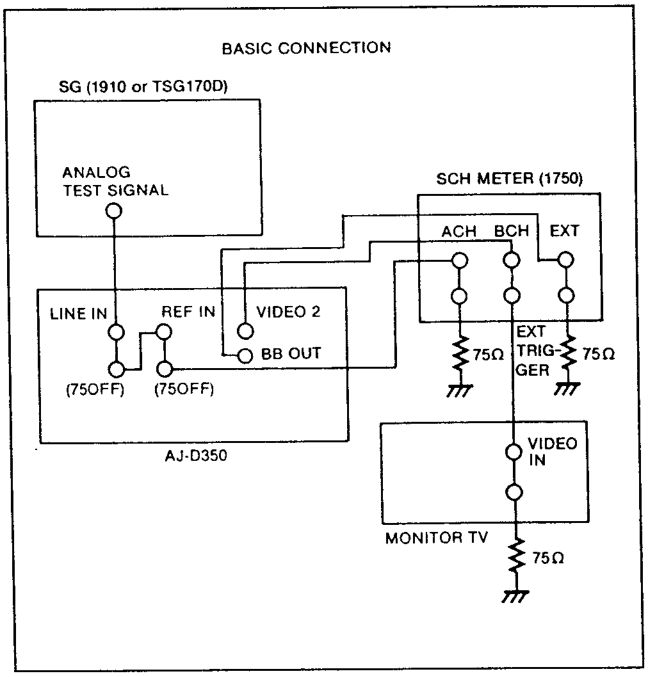
ADJUSTMENT SECTION

4-7. SCH METER ADJUSTMENT
4-9. REF CF DETECTION (3) ADJUSTMENT
4-6. REF SCH ADJUSTMENT



P=PAL N=NTSC

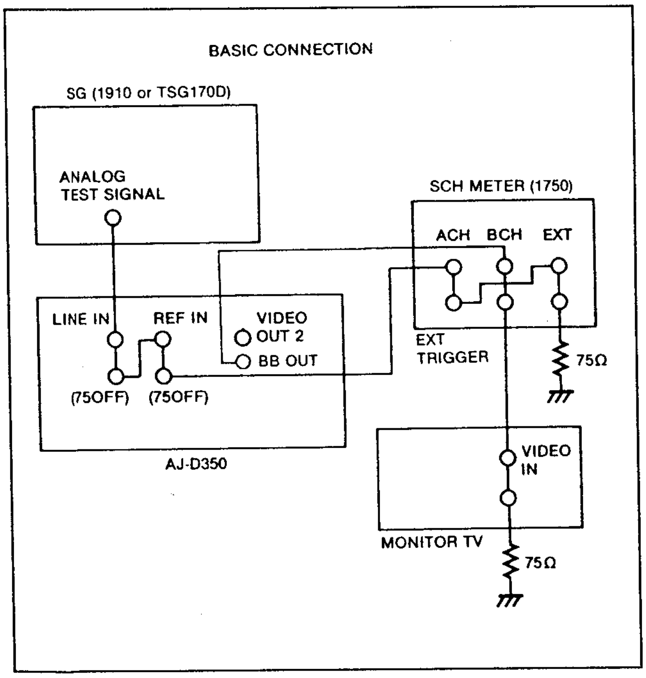
MACHINE CONDITION (SET UP CONDITION 2)



ADJUSTMENT SECTION

4-11. SYS SC PHASE ADJUSTMENT
4-12. SYS SC PHASE (2) ADJUSTMENT

MACHINE CONDITION (SET UP CONDITION 3)



ADJUSTMENT SECTION

4-13. BB OUT SYNC LEVEL ADJUSTMENT
4-14. BB OUT SC PHASE ADJUSTMENT
4-15. BB OUT SCH ADJUSTMENT
4-16. BB OUT H PHASE (1) ADJUSTMENT
4-17. BB PIT H PHASE (2) ADJUSTMENT
4-18. BB OUT BURST LEVEL ADJUSTMENT
4-19. BB OUT BURST POSITION & WIDTH ADJUSTMENT

4-1. BF PULSE POSITION ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	TP9[I1], TP1[I3], TP3[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR1 (VF POS)[F3]

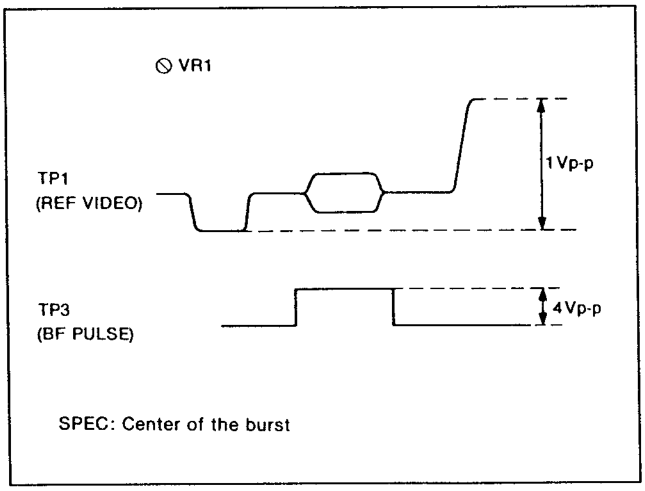
8000 SERIES

<STEP 1>

1. SCOPE : TP9
2. Confirm that the DC voltage is 2.25 ± 0.1V DC.

<STEP 2>

1. SCOPE CH1 : TP1
   CH2 : TP3
2. Adjust VR1 so that the BF pulse is centered on the burst signal as shown in Figure.



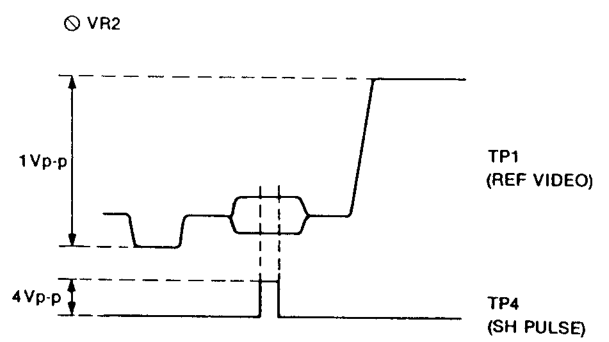
4-2. SH PULSE POSITION ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	TP1[I3], TP4[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR2 (SH POS)[F3]

8000 SERIES

<STEP 1>

1. SCOPE CH1 : TP1
   CH2 : TP4
2. Adjust VR2 so that the SH pulse is located at center of the burst signal as shown in Figure.



SPECIFICATION: Burst is at center of TP3 pulse

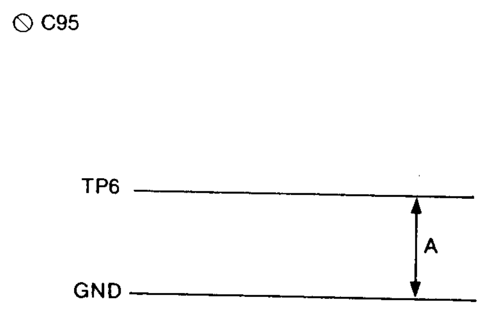
4-3. REF PLL ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	TP6[I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	C95 (REF CLK FREQ)[I1]

8000 SERIES

<STEP 1>

1. SCOPE CH1 : TP6
2. Adjust C95 so that the DC voltage is 0 ± 0.1V DC.



SPECIFICATION: A=0±0.1V DC

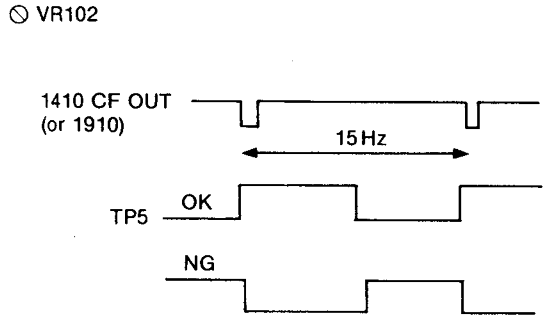
4-4. REF CF DETECTION ADJUSTMENT (1) (COARSE ADJ.) (L4 : VIDEO PROCESS)

TEST	TP5[H2]
MODE	EE2 (EJECT), SW102 (SW TEST)[D6] is ON
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR102 (LEVEL DET)[L2]

8000 SERIES

<STEP 1>

1. Confirm that the jumper SW102 is set to ON side.
2. SCOPE CH1 : 1410 or 1910 CF OUT
   CH2 : TP5
3. Adjust VR102 so that the CF Pulse rise on head portion of color frame 4. This adjustment is coarse adjustment. The next "REF CF DETECTION ADJUSTMENT (2)" should be adjusted.
   SW102 is set to OFF position after next adjustment is completed.



Specification: CF phase is correct.

Note: 1910 needs CF out modification.
Please contact with TEKTRONIX for this modification.

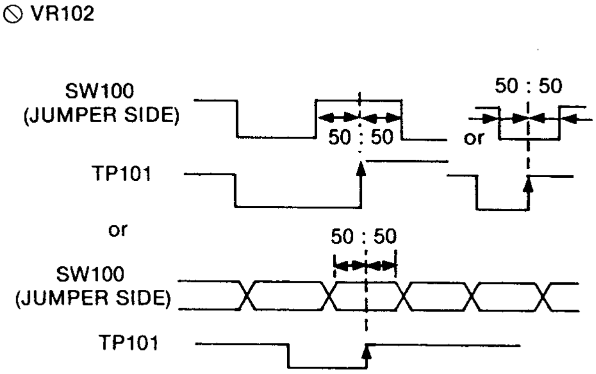
4-5. REF CF DETECTION ADJUSTMENT(2) (FINE ADJ.)(L4 : VIDEO PROCESS)

TEST	TP101[L3], SW100[L3]
MODE	EE2(EJECT), SW102(SCHETEST)[D6] is ON
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR102 (LEVEL DET)[L2]

8000 SERIES

<STEP 1>

1. SCOPE CH1 : TP101
   CH2 : SW100 Jumper side
2. Adjust VR102 so that the rising edge of the TP101 is at center of the High or Low period of 3.58MHz pulse at SW100 jumper side.
3. The upper of the drawing shows the trigger is stable and lower of it shows the trigger is unstable.
4. Set SW102 to OFF side.



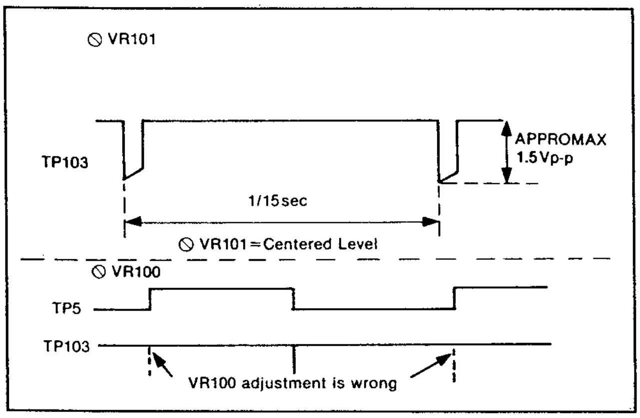
4-6. REF SCH DETECTION ADJUSTMENT (1)(L4 : VIDEO PROCESS)

TEST	TP5[H2], TP103[M3]
MODE	EE2 (EJECT), SW102 (SCH TEST)[D6] ON
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG170 or 1410 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR101 (SCH DET 2)[M2], VR100 (SCH DET 1)[L1]

8000 SERIES

<STEP 1>

1. Set SW102 (SCH TEST) to ON position.
2. Set VR100 (SCH DET 1) at center position.
3. SCOPE CH1 : TP103
   CH2 : TP5
4. Confirm that pulse signal of TP103 level is changed, when turn VR101 to clockwise or counter-clockwise.
5. Adjust VR101 so that the pulse at TP103 is centered level between minimum (0V) and maximum (2 ~ 3V).
6. If the VR100 position is incorrect. The unstable pulse appear as shown in the bottom of the figure. In this case adjust VR100 so that puse position is stable and adjust item 5 again.



4-7. SCH METER ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT
TAPE	
M.EQ	SCH METER
INPUT	1410 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR105 (SCH GAIN [K4], VR106 (SCH OFFSET)[K4]

8000 SERIES

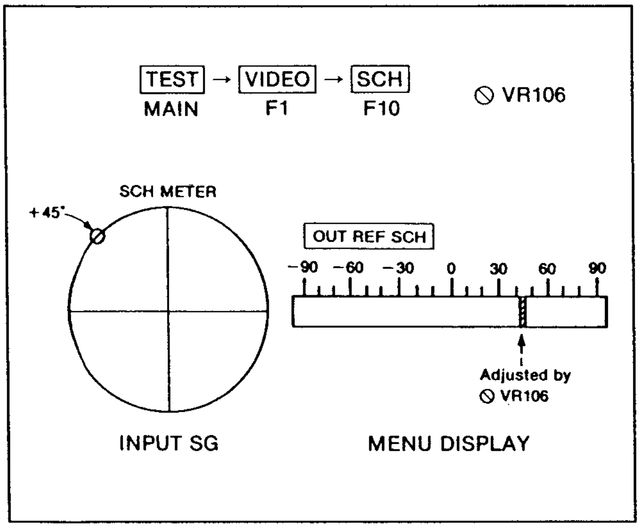
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.(Page 6)

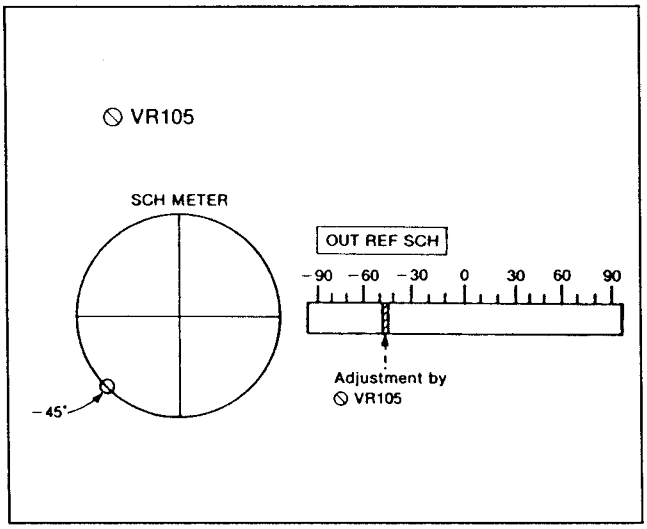
<STEP 2>

1. SCH METER : SCH MODE
2. Adjust the Potention Meter VR on 1410 so that the SCH phase becomes +45° at SCH METER.(Page 6)
3. Display the OUT REF SCH METER as follows TEST → F1 VIDEO → F10 SCH.
4. Adjust VR106 so that the OUT REF SCH METER displayed +45°.



<STEP 3>

1. Adjust the Potention Meter VR on 1410 so that the SCH phase becomes -45° at SCH METER.
2. Display the OUT REF SCH METER VR as follows TEST → F1 VIDEO → F10 SCH.
3. Adjust VR105 so that the OUT REF SCH METER displayed -45°.



<STEP 4>

1. Re-adjust above <STEP 2> and <STEP 3> until stabilize the position of VR105 and VR106.

4-8. REF SCH DETECTION ADJUSTMENT (2)(L4 : VIDEO PROCESS)

TEST	TP104[L3], TP105[J3], TP106[J3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (OSCILLOSCOPE)
INPUT	1410 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR103 (SCH -L)[J2], VR104 (SCH -H)[J2]

8000 SERIES

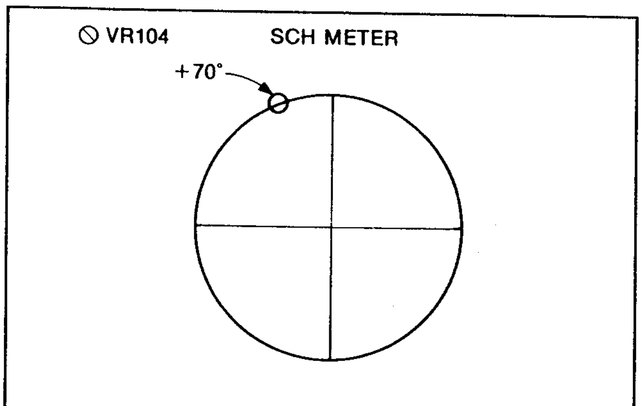
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.(Page 6)

<STEP 2>

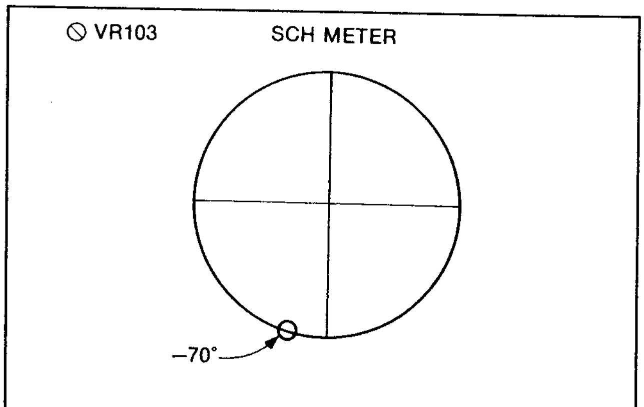
1. SCH METER : SCH MODE
2. Adjust the Potention Meter VR on 1410 so that the SCH phase becomes +70° at SCH METER.
3. SCOPE CH1 : TP106
   CH2 : TP104
4. Measure the voltage at TP104.
5. Adjust VR104 so that the DC voltage at TP106 is TP104 ± 20mV.



SPECIFICATION: TP106=TP104±20mV

<STEP 3>

1. Adjustment the Potention Meter VR on 1410 so that the SCH phase becomes -70° at SCH METER.
2. SCOPE CH1 : TP105
   CH2 : TP104
3. Measure the voltage at TP104.
4. Adjust VR103 so that the DC voltage at TP105 is TP104 ± 20mV.



SPECIFICATION: TP105=TP104±20mV

4-9. REF SCH DETECTION ADJUSTMENT (3)(L4 : VIDEO PROCESS)

TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN, SCH = 0°
ADJ.	VR101 (SCH DET 2)[M2]

8000 SERIES

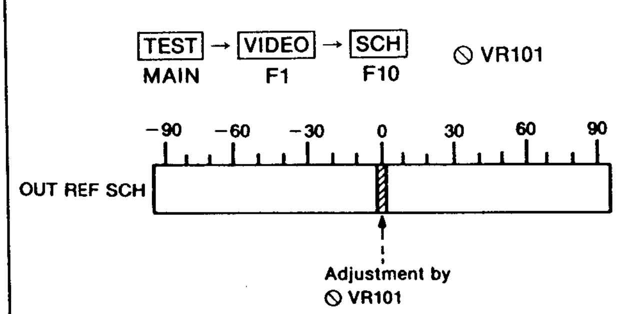
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>

1. Confirm the test signal generator output SCH is 0°.
2. Turn the power OFF and ON.
3. Display the OUT REF SCH METER on TEST VIDEO MENU.
4. Adjust VR101 so that the OUT REF SCH METER displayed 0°.



SPECIFICATION: 0° on the front panel meter.

4-10. SYS PLL ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	TP108[K2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR108[K2]

8000 SERIES

<STEP 1>

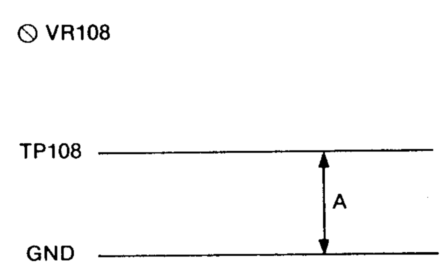
MACHINE CONDITION

Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>

1. SCOPE : TP108
2. Adjust VR108 so that the DC voltage is 2.5V ± 0.005V DC.

SPECIFICATION : 2.5V ± 0.005V DC



SPECIFICATION: A=2.5V±0.005V DC

4-11. BB OUT SYNC LEVEL ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR202 (BB SYNC GAIN)[O3], VR203 (BB C LEVEL)[N1]

8000 SERIES

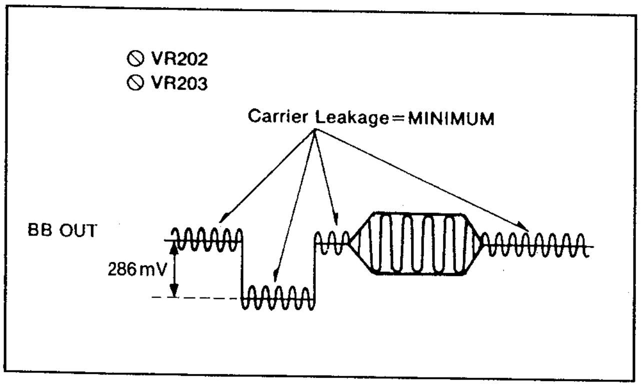
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>

1. SCH METER : WFM mode
2. SCH METER INPUT : CHA : SG VIDEO
   CHB : BB OUT
3. Adjust VR202 so that the Sync level of BB is 286mV as shown in Figure. Confirm the sync level is same with CHA (SG Video sync level).
4. Adjust VR203 so that the carrier leak is become minimum.



4-12. BB OUT SC PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	REF VIDEO BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM, SCH MODE)
INPUT	ANALOG 75% COLOR BAR to VIDEO IN
ADJ.	VR204 (BB C PHASE)[O3], VR3 (H POS 1) [G3], VR5 (H POS 2)[F1]

8000 SERIES

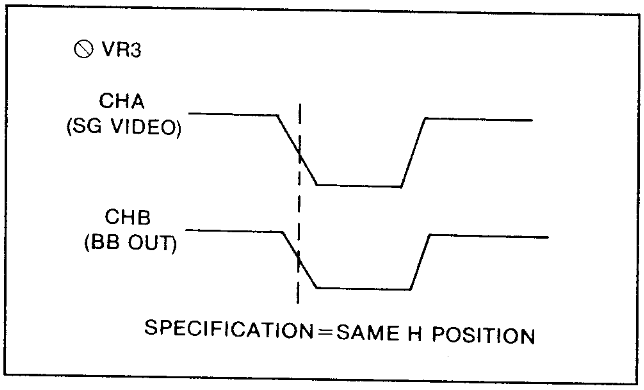
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

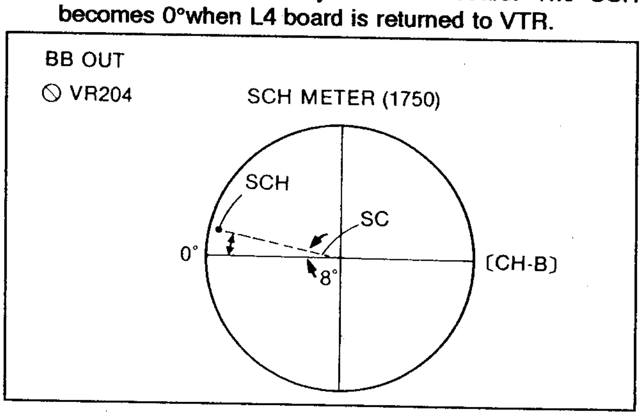
<STEP 2>

1. SCH METER : WFM mode, EXT trigger
2. SCH METER INPUT : CHA : SG VIDEO
   CHB : BB OUT
3. Adjust VR3 so that the H phase of BB out is same H sync phase with CHA (SG VIDEO) at center position. This is a coarse adjustment of VR3.



<STEP 3>

1. SCH METER : SCH mode, EXT trigger
   CHA : SG VIDEO
   CHB : BB OUT
2. Set the SCH meter CHA position at correct position. Select SCH meter to CHB.
3. Adjust VR5 so that the SCH of B.B out delayed +8° against REF IN.
4. Adjust VR204 so that the burst phase delayed +8° against burst on CHA.
5. +8° delay is caused by extention board. The SCH becomes 0°when L4 board is returned to VTR.



4-13. BB OUT BURST LEVEL ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	BB OUT [REAR PANEL]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR205 (BB BS GAIN)[O2]

8000 SERIES

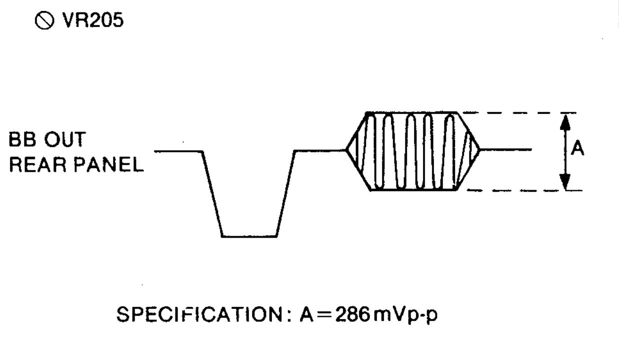
<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>

1. SCH METER : WFM mode, EXT trigger
2. SCH METER INPUT : CHA : SG VIDEO
   CHB : BB OUT
3. Adjust VR205 so that the burst level is 286m Vp-p.
4. Confirm that the CHB (BB OUT) H phase and burst level on CHA (REF VIDEO).



4-14. BB OUT PHASE ADJUSTMENT (2) (L4 : VIDEO PROCESS)

TEST	BB OUT (REAR PANEL)
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR200 [N1], VR201 [N1]

8000 SERIES

<STEP 1>

MACHINE CONDITION

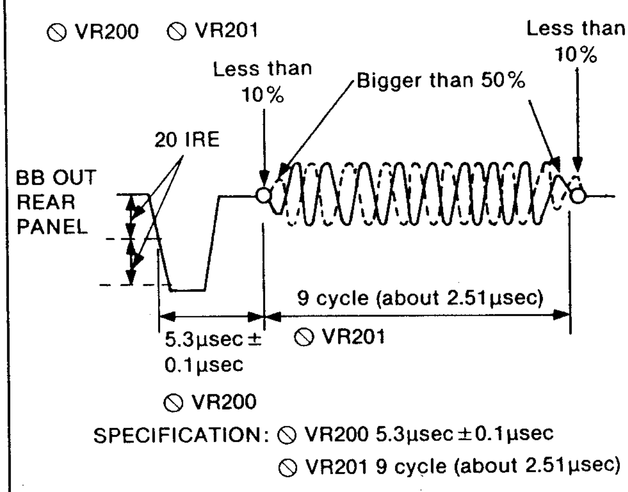
Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>

1. SCOPE : BB OUT
2. Adjust VR200 so that the burst start position is 5.3μsec ± 0.1μsec.

<STEP 3>

1. SCOPE : BB OUT
2. Adjust VR201 so that the burst width is 9 cycle (about 2.51μsec.



4-15. BB OUT H PHASE ADJUSTMENT (1)(L4 : VIDEO PROCESS)

TEST	BB OUT TP303[A3], TP304[B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE) OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR3 (H POS 1)[G3]

8000 SERIES

<STEP 1>

MACHINE CONDITION

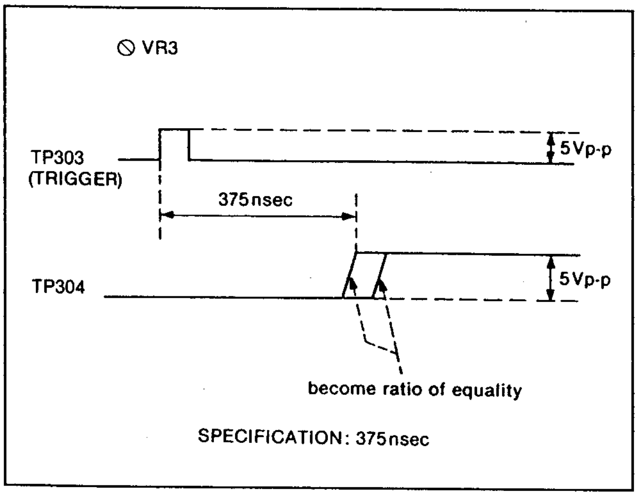
Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>

1. WFM : BB OUT
   EXT REF TRIGGER
2. Confirm the BB out H phase is stable.

<STEP 3>

1. SCOPE CH1 : TP303 (TRIGGER)
   SCOPE CH2 : TP304
2. Adjust VR3 so that H phase is the same phase against the H phase on CHA.



4-16. SYS SC PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	VIDEO OUT 2
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	TSG273 75% COLOR BAR to VIDEO IN
ADJ.	VR107 (SYS SC OFFSET)[E2]

8000 SERIES

<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 2 at the beginning of this SECTION.

<STEP 2>

MENU CONDITION

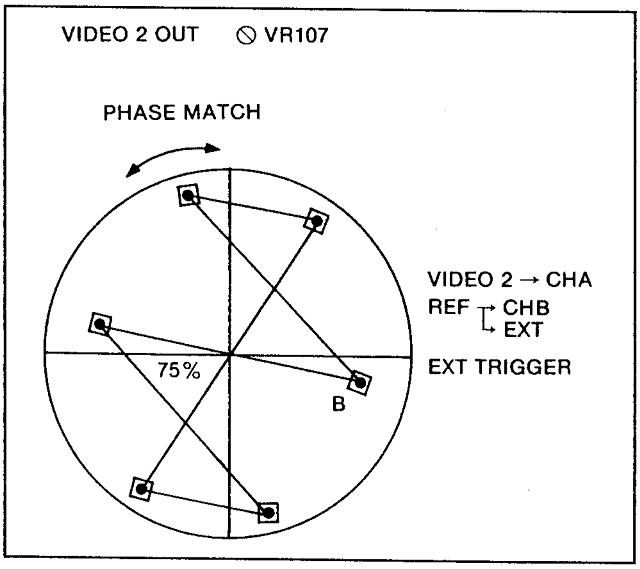
VIDEO OUT MENU : F7
Select the SC to "UNITY" mode.

<STEP 3>

1. SCH METER : SCH : MODE
2. SCH INPUT : CHA
3. Adjust the phase VR on SCH METER so that the burst phase becomes standard position at SCH METER.

<STEP 4>

1. SCH INPUT : CHB
2. Adjust VR107 so that the burst phase becomes the same phase as REF VIDEO (CHA).



4-17. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (1) (L4 : VIDEO PROCESS)

TEST	TP5[H2], TP1[I3], VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR TO VIDEO IN and REF VIDEO IN
ADJ.	Confirmation only

8000 SERIES

<STEP 1>

1. Confirm that the adjustment of L2 and S9 sections are completed.

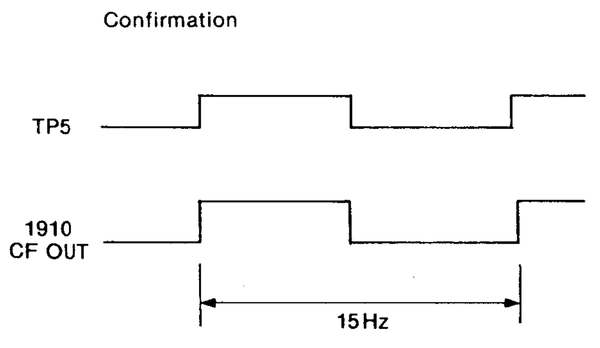
<STEP 2>

MENU CONDITION

HOME MENU SET UP
Select the OUT REFERENCE to "INCOM".

<STEP 3>

1. SCOPE CH1 : TP1
   CH2 : TP5
2. Confirm that the relation between REF VIDEO and CF pulse is as shown in Figure.



SPECIFICATION: CF phase match

4-18. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (2) (L4 : VIDEO PROCESS)

TEST	VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	75%COLOR BAR to VIDEO IN and VIDEO IN
ADJ.	VR4 (1H POS)[I4] (COARSE)

8000 SERIES

<STEP 1>

1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>

MENU CONDITION

HOME MENU SET UP
Select the OUT REFERENCE to "INCOM".

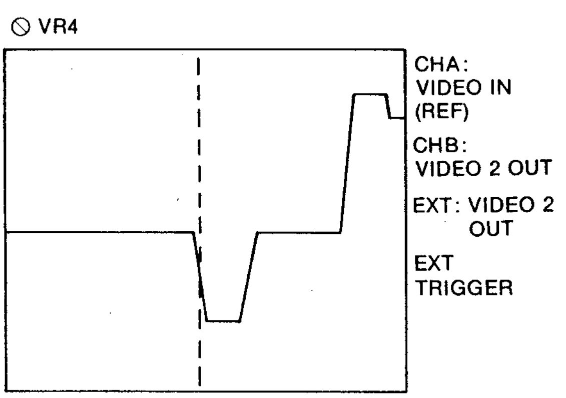
<STEP 3>

MACHINE CONDITION

Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>

1. SCH METER : WFM Mode
2. Adjust VR4 so that the H phase on CHB is matched REF signal (CHA).



SPECIFICATION: H phase match

4-19. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (3) (L4 :VIDEO PROCESS)

TEST	TP303[A3], TP304[B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR4 (IH POS)[I4] (FINE)

8000 SERIES

<STEP 1>

1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>

MENU CONDITION

HOME MENU SET UP
Select the OUT REFERENCE to "INCOM".

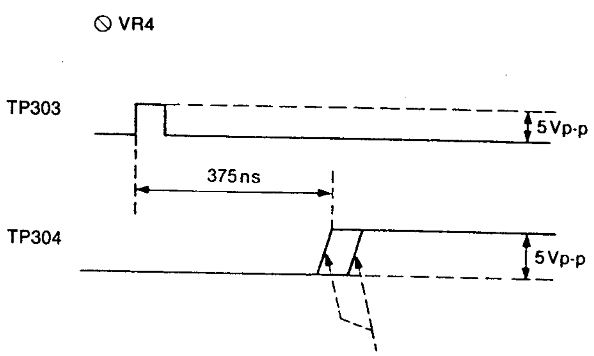
<STEP 3>

MENU CONDITION

Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>

1. SCOPE CH1 : TP303
   CH2 : TP304
2. SCOPE TRIGGER : CH1
3. Adjust VR4 so that the relation between HC signal as shown in Figure.



SPECIFICATION: 375nsec

4-20. DIGITAL VIDEO OUT CLOCK PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	DIGITAL VIDEO OUT 25pin D-SUB
MODE	EE1
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	SW860 [M8], SW861 [M8]

8000 SERIES

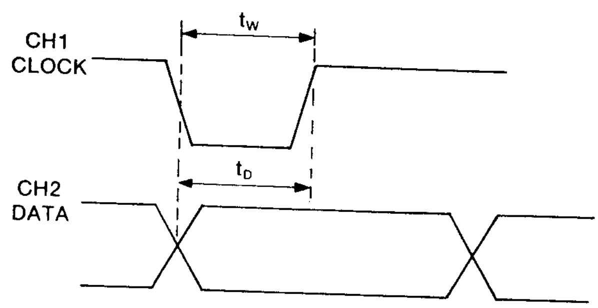
<STEP 1>

SCOPE CH1 : DIGITAL VIDEO OUT D-SUB 1Pin
CH2 : DIGITAL VIDEO OUT D-SUB 7Pin

<STEP 2>

Adjust SW860 and SW861 so that the clock and data phase is shown in figure.

(1) Set SW861-7bit to ON and SW860 -2bit to ON or set SW861-8bit to ON and set one of the bit of SW861 bit1 - bit5 to ON.



SCOPE 200mV/div., 10nsec/div.

SPECIFICATION t_W=35nsec±5nsec
t_D=35nsec±5nsec

5. REC/PLAY CH0 (S1) BOARD
REC/PLAY CH1 (S2) BOARD

Adjust procedure with S1 and S2 board the same.

MACHINE CONDITION

Set the SW51 on the L2 board to OFF as shown in Figure 1.
Turns Line and Field shuffle off.

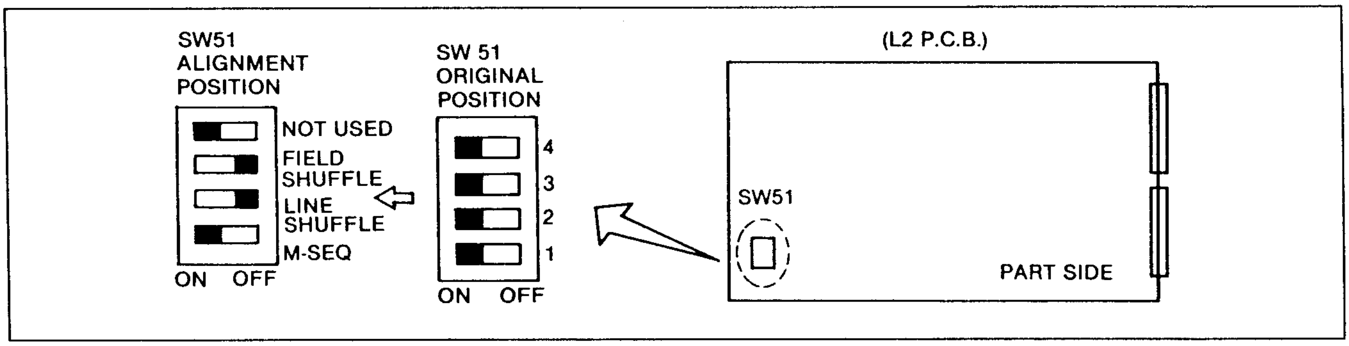
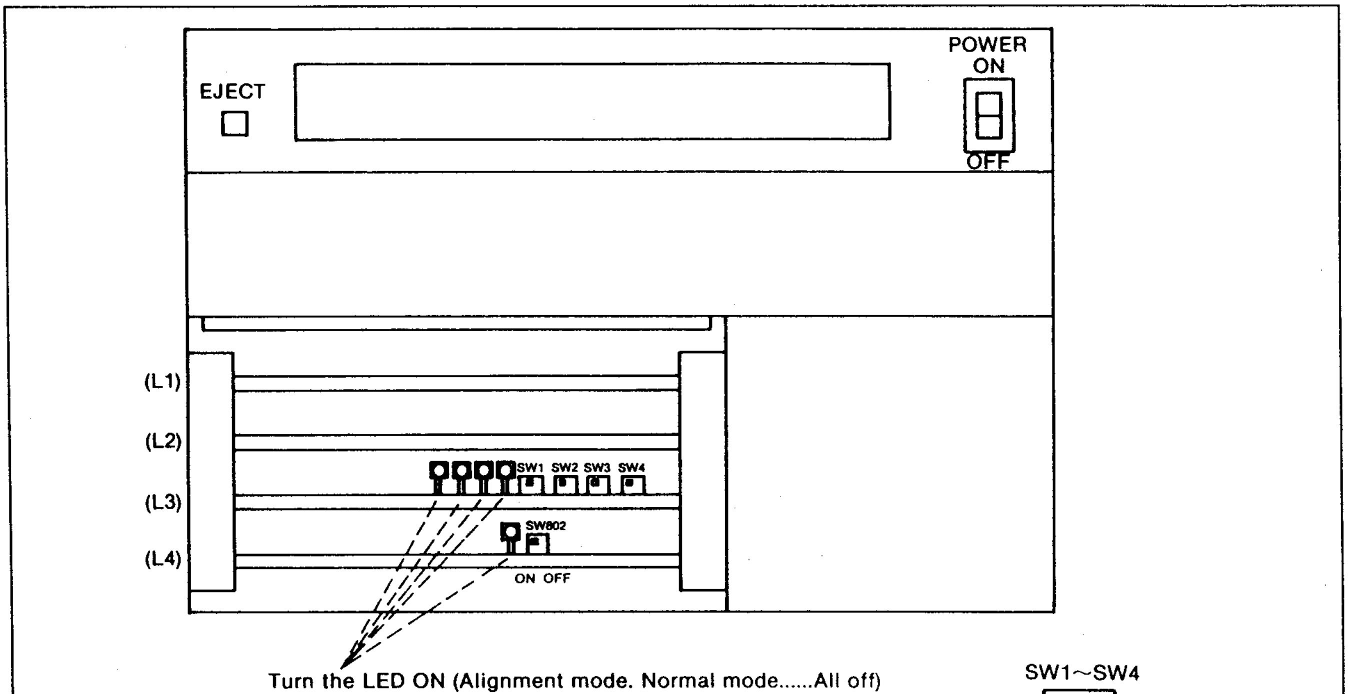


Figure 1.

1. Set the SW1, 2, 3 and 4 on the L3 P.C.B. follow the Figure 2.
2. Set the SW802 on the L4 P.C.B. follow the Figure 2.
3. Confirm that the 5 LED's are turned ON.



SW1 (VIDEO INNER ECC): OFF
SW2 (AUDIO OUTER ECC): OFF
SW3 (AUDIO INTERPOLATION): OFF
SW4 (VIDEO OUTER ECC): OFF
SW802 (CONCEAL ECC): OFF

Figure 2.

Set the Dip SW's on the S1 and S2 P.C.B. follow the as shown in Figure 3.

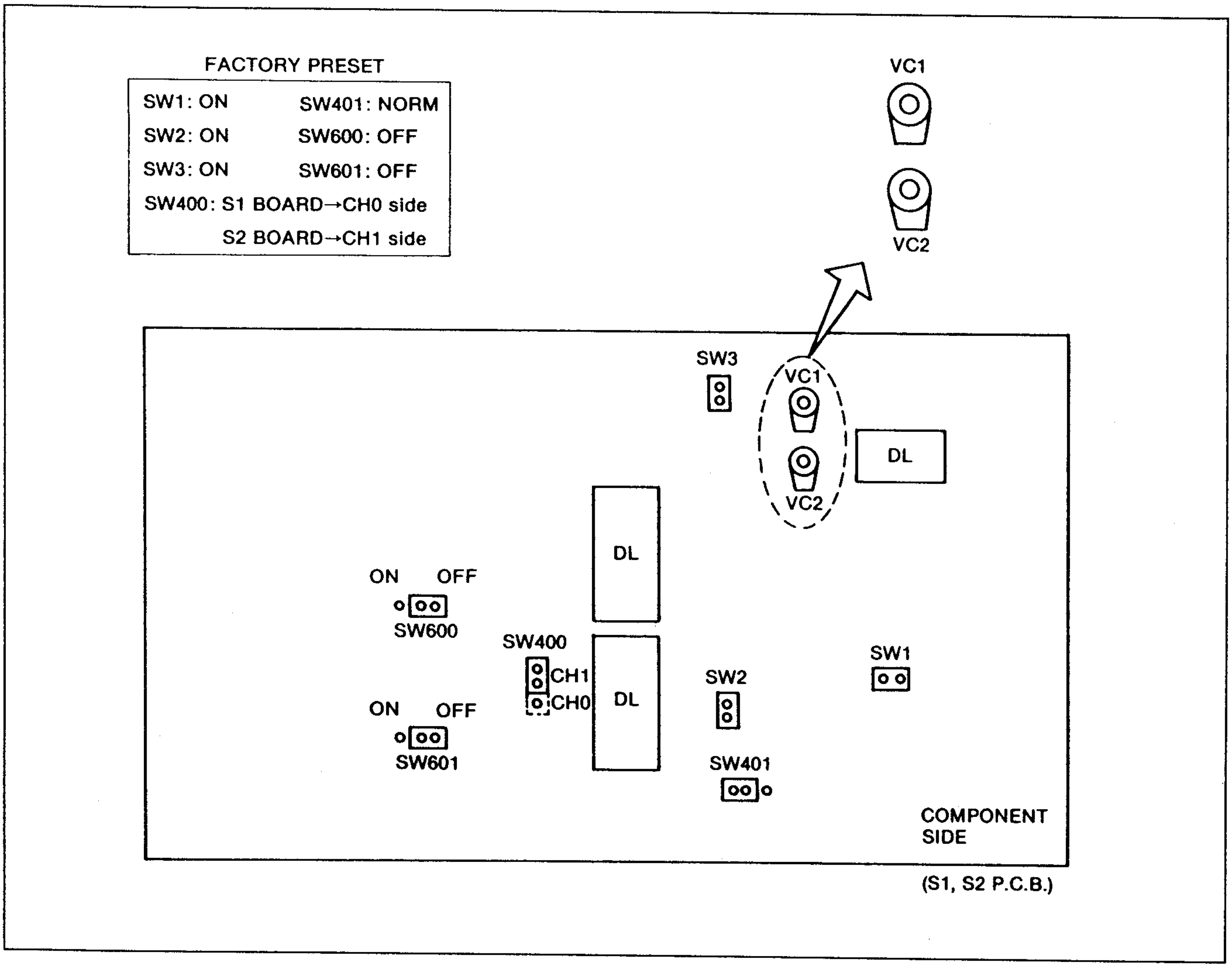
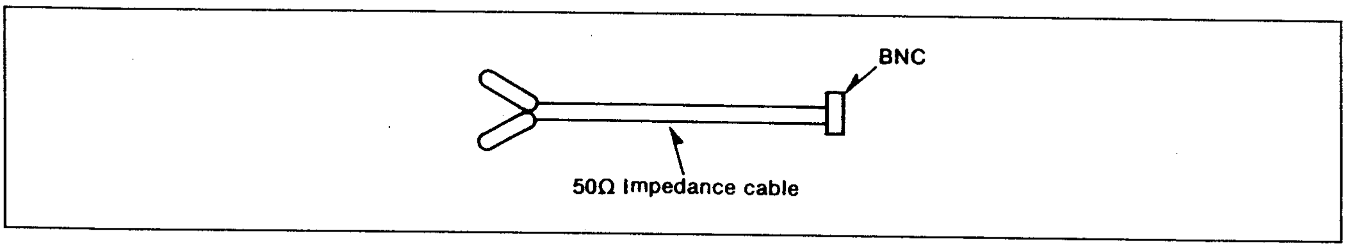
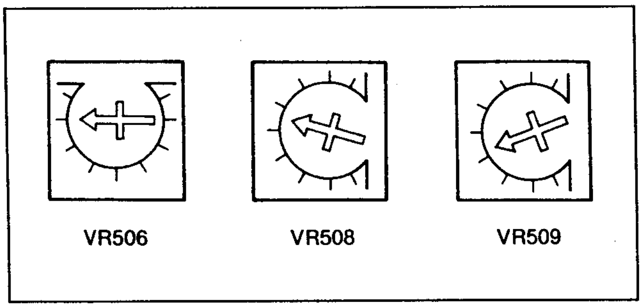


Figure 3.



Note: 1. These VRs are not used as follows.
VR600,VR601,VR602,VR603,VR604,
VR605,VR606,VR607,VR614,VR615
2. Set the VR506, VR508 and VR509 as follows.



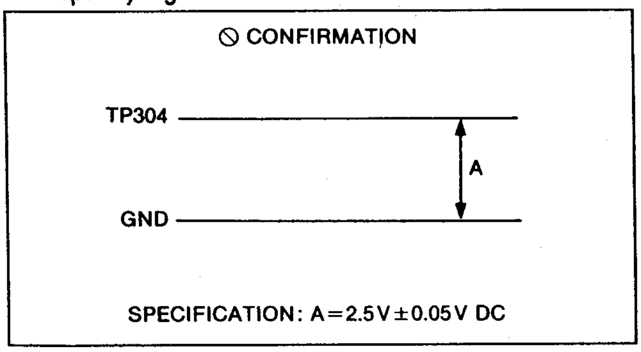
5-1. PLL ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

<STEP 1>

SPEC	TP304 = 2.5V DC ± 0.05V DC
TEST	TP304[A1]
MODE	VIDEO OUT SET UP STATE EE2,STBY OFF
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	

5000 SERIES

1. SCOPE : TP304
2. Set VTR into STAND BY OFF mode.
3. Confirm that the DC voltage is 2.5 ± 0.05V DC. If it is not confirm the Servo HT (Head Tape relative speed) signal on S5 board.



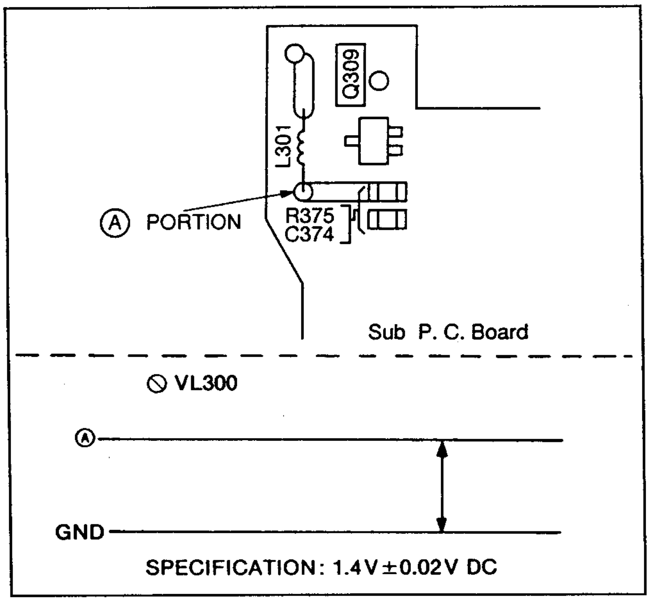
PLL ADJUSTMENT

<STEP 2>

SPEC	1.4V DC ± 0.02V
TEST	L301 Lower Side
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VL300 (OSC OFFSET)[B1]

5000 SERIES

1. SCOPE : L301 Lower Side
2. Adjust VL300 (OSC OFFSET) so that the voltage is 1.4 ± 0.02V DC.



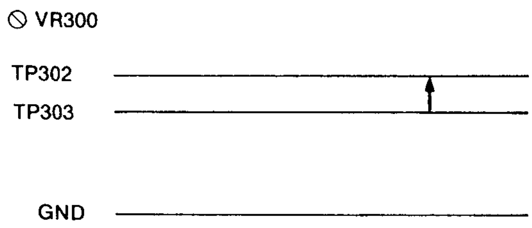
PLL ADJUSTMENT

<STEP 3>

SPEC	TP303 DC VOLT = TP302 DC VOLT
TEST	TP302 [C1], TP303 [B1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR300 (PLL OFFSET)[A1]

5000 SERIES

1. SCOPE CH1 : TP302
   CH2 : TP303
2. Adjust VR300 (PLL OFFSET) so that the voltage of TP302 and TP303 are same.



SPECIFICATION:
TP302 DC Voltage=TP303 DC Voltage
(about 1V DC)

PLL ADJUSTMENT

<STEP 4>

SPEC	TP300 IS MAXIMUM PEAK TO PEAK
TEST	TP300 [B2]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR10 (COMP BIASE)[F1]

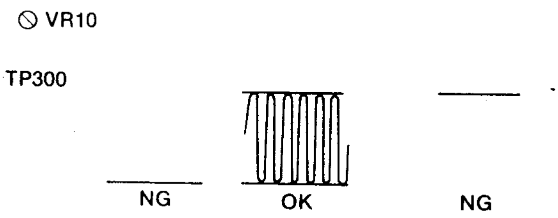
5000 SERIES

1. Insert an adjustment tape color bar portion.
2. Set the STBY OFF status to "TAPE" mode.

   VIDEO OUT SET UP TAPE

3. Set the VTR into STBY OFF mode.
4. SCOPE : TP300
5. Adjust VR10 (COMP BIASE) so that the data signal level is maximum.

Note: Set the 20MHz Filter of oscilloscope to OFF mode.



SPECIFICATION:
DATA signal level is maximum.

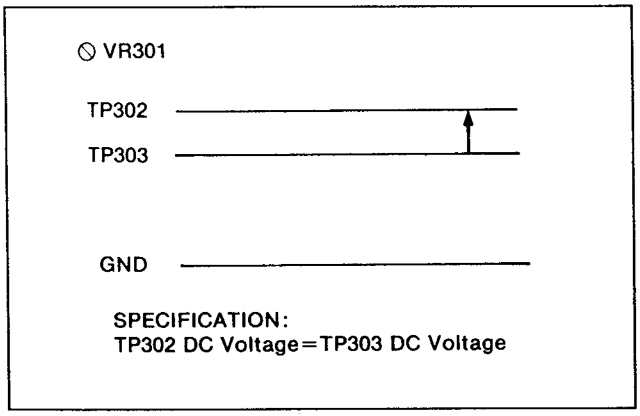
PLL ADJUSTMENT

<STEP 5>

SPEC	TP302 DC VOLTAGE = TP303 DC VOLTAGE
TEST	TP302 [B1], TP303 [B1]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR301 (DC BALANCE)[C1]

5000 SERIES

1. SCOPE CH1 : TP302
   CH2 : TP303
2. Adjust VR301 (DC BALANCE) so that the voltage of TP302 and TP303 are same.



PLL ADJUSTMENT

<STEP 6>

SPEC	TP301 CLOCK IS LOCKED WITH TP300
TEST	TP301 [B2], TP300 [B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	CONFIRMATION ONLY

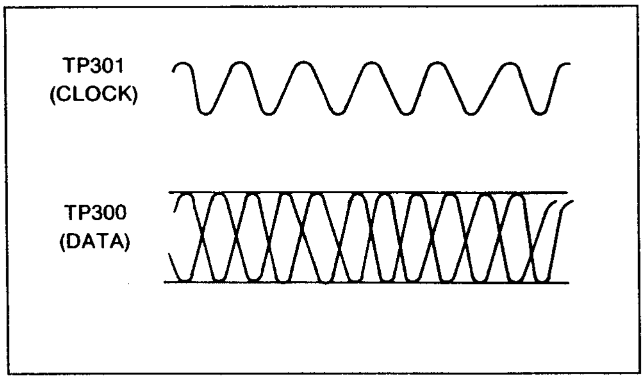
5000 SERIES

1. Set the STBY OFF status to "EE2" mode.

   VIDEO OUT SET UP

2. SCOPE CH1 : TP301/TPG300
   CH2 : TP300 --- TRIGGER
3. SCOPE : 500mV/AC
   SETTING : SWEEP = 10nsec/div
4. Confirm that the DATA signal and CLOCK signal are frequency locked.

Note: Set the 20MHZ Filter of oscilloscope to OFF mode.



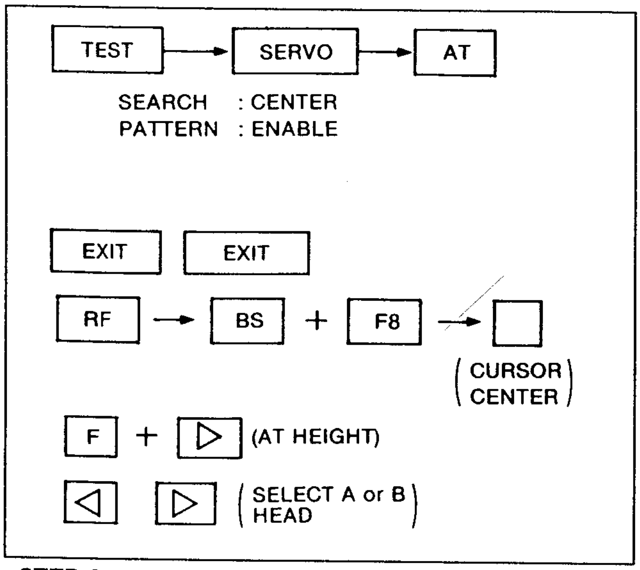
5-2. ENVELOPE MAX ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	RF ENVELOPE IS MAXIMUM
TEST	TP8[E2],P3-B22(RIGHT SIDE) of Extension Board
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	Adj. KNOB (on the Front Panel), AT HEIGHT

5000 SERIES

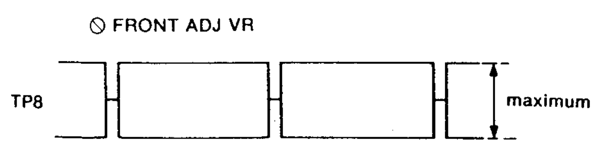
<STEP 1>

MENU CONDITION
TEST SERVO AT HEIGHT



<STEP 2>

1. Playback a shuffling off 75% Color bar Alignment Tape on VAR X1 mode.
2. Adjust the Adj. KNOB VR on the Front Panel so that the Envelope is maximum.



SPECIFICATION: RF Maximum

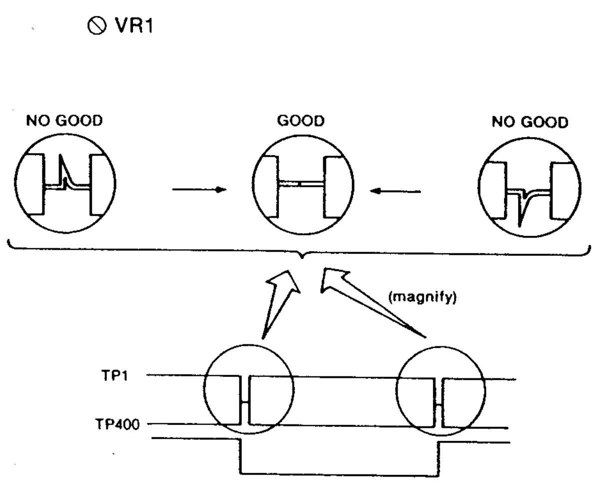
5-3. AB DC BAL ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	CHA DC = DC
TEST	TP1[H3], TP400[F4]
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (A/B DC BAL)[H1]

5000 SERIES

<STEP 1>

1. SCOPE CH1 : TP1 : TPG1
   CH2 : TP400
2. SCOPE CH1 : 50mV/DC 50Ω
   CH2 : 5V/DC
3. SCOPE MODE : CHOP
4. SCOPE TRIG : CH4
5. SCOPE SWEEP : A = 2ms/div
   B = 50μS/div
6. Adjust VR1 so that the Envelope is as shown in Figure.



SPECIFICATION: CHA DC=CHB DC

5-4. ENVELOPE DETECTION ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	ENVELOPE MINIMUM DC LEVEL = 0V ± 0.2VDC ENVELOPE MAX. = 2Vp-p ± 0.2V
TEST	TP502 [H4], TP400 [F4], TP8 [E2]
MODE	STILL
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2(A/B GAIN BAL)[H1], VR500(ENV GAIN)[I4], VR501 (ENV OFFSET) [I4]

5000 SERIES

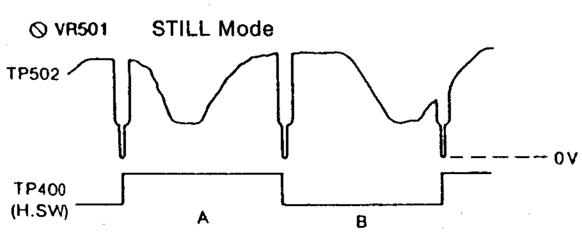
<STEP 1>
MENU CONDITION

TEST SERVO AT

Set the [PATTERN] to "FIX".

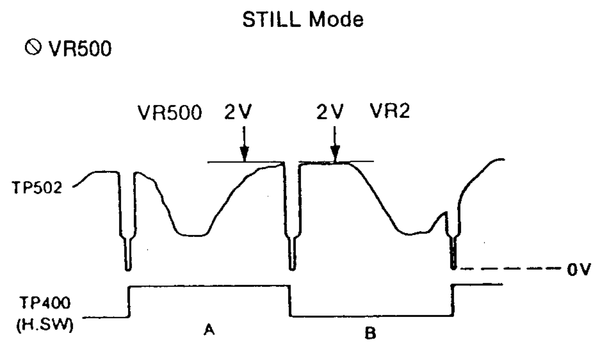
SEARCH = CENTER
PATTERN = FIX

<STEP 2>
1. SCOPE CH1 : TP502
   SCOPE CH2 : TP400
2. SCOPE SETTING : 1V/DC
   SCOPE CH2 : 5V
3. SCOPE MODE : CHOP
   BW
4. SCOPE TRIG : CH2
5. SCOPE SWEEP : 2ms
6. Place the unit in the STILL mode.
7. Adjust VR501 so that the minimum signal level is 0V ± 0.2V as shown in Figure.



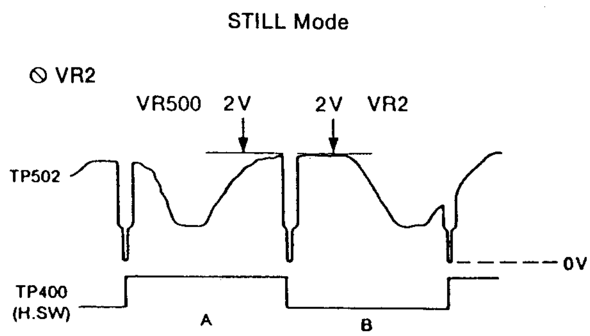
SPECIFICATION:
Envelope minimum DC level is 0V±0.2V DC.

<STEP 3>
1. SCOPE CH1 : TP502
   SCOPE CH2 : TP400
2. Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head Switch A portion.
3. Adjust VR500 (ENV GAIN) so that the maximum envelope level is 2V ± 0.2V.



SPECIFICATION:
Envelope Maximum=2V±0.2V (H SW A)

4. Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head switch B portion.
5. Adjust VR2 (A/B GAIN BAL) so that the maximum envelope is 2V ± 0.2V.
6. After adjustment set the AT HEIGHT is 0.
7. After this adjustment, item 8-1 ENVELOPE DETECTION ADJUSTMENT is required.

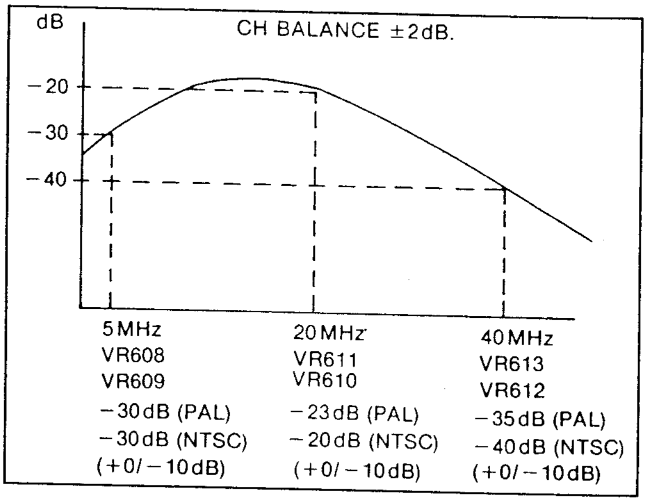


SPECIFICATION:
Envelope Maximum=2V±0.2V (Head SW B)

5-5. EQUALIZATION ADJUSTMENT (1) (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

Factory Preset only, skip this item after Head Replacement.

SPEC	
TEST	TP8[E2], VIDEO OUT, TP400[F4]
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	See Below



5000 SERIES

<STEP 1>

Adjustment VR.

(1) VR3 (PHASE SHIFT) -------6 division
(2) VR609 (MAG A) -------------7 division
VR608 (MAG B) -------------7 division
(3) VR613 (AFC HA) ------------5 division
VR612 (AFC HB) ------------5 division
(4) VR611 (AFC MA) ------------2 division
VR610 (AFC MB) ------------2 division

<STEP 2>

1. Set the spectrum analyzer to REG 4 mode.

REG 4 mode

ITEM	PARAMETER	
(1)	REF LEVEL	-10.0dBm
(2)	ATTEN	10dB
(3)	DIV (dB/DIV)	5dB/div
(4)	START FREQUENCY	0MHz
(5)	STOP FREQUENCY	50MHz
(6)	RES BW	1MHz
(7)	VIDEO BW	3kHz
(8)	SWEEP TIME	300msec
(9)	TRIGGER	EXT (HEAD SW)
(10)	VID AVG	10

<STEP 3>

EQUALIZER COARSE ADJUSTMENT

1. Connect the spectrum analyzer to TP8.
2. Connect the EXT trigger input of the spectrum analyzer to TP400 (HEAD SW).
3. Adjust VR609 (MAG A) and VR608 (MAG B) so that the gain is -30dB +0/-10dB at 5MHz portion.
4. Adjust VR613 (AFC HA) and VR612 (AFC HB) so that the gain is -35dB +0/-10dB at 40MHz portion.
5. Adjust VR611 (AFC MA) and VR610 (AFC MB) so that the gain is -23dB +0/-10dB at 20MHz portion.

Note: If still out of specification.
Just adjust as A curve as shown in Figure.
And then carry on next the adjustment.

5-6. EQUALIZATION ADJUSTMENT (2) (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

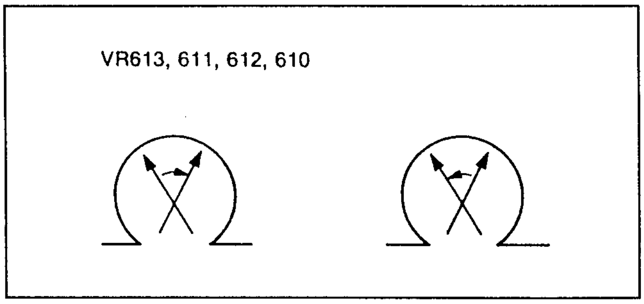
SPEC	MINIMUM ERROR RATE
TEST	TV MONITOR, FRONT ERROR DISPLAY
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR611 (AFC MA)[F1], VR610 (AFC MB)[F1], VR613 (AFC HA)[E1], VR612 (AFC HB)[E1], VR10 (COMP BIAS LEVEL)[F1], VC301 (PHASE ADJ)[A2], VC1 (RESON A)[G2], VC2 (RESON B)[G2], VR3 (PHASE SHIFT)[I2] VR608(MAG B), VR609(MAG A)[D1], VR11 (AUTO EQ IN LEVEL)[E1] VR12 (AFC MATCH)[F4]

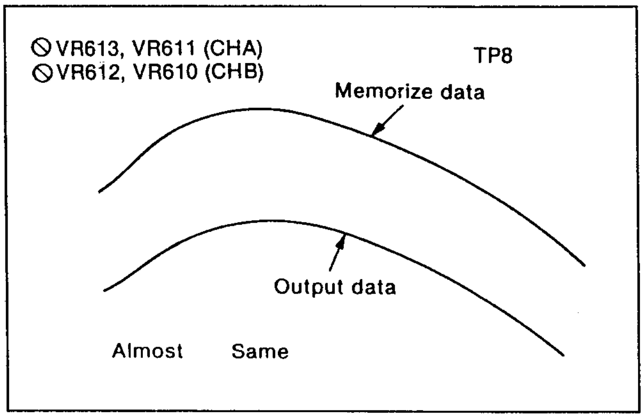
5000 SERIES

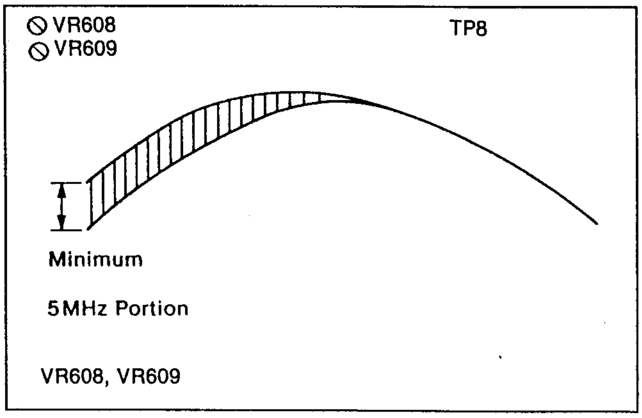
[RF SECTION]

<STEP 1>

1. Use the "75% Color Bars Shuffle OFF" tape.
2. Search = "CENTER"
   Maximize the envelope bar graphs on the front panel by adjusting the AT heights in the SUPER USER Menu.
3. Choose "PB mode : ch0" on the SUPER USER MENU when adjusting the Equalizer CH0 board, and "PB mode : ch1" for the CH1 board at the same time video output picture must be stable.
4. Center VC1/VC2.
5. Use VR3/VR10/VC301 to minimize errors (speckling) on the picture monitor. Continue adjusting these three pots until no further improvement is possible.
6. Use VC1, VC2 & VR3 to further reduce the errors.
7. Use VC1, VC2 & VR10 in the same manner.
8. Adjust VC301 to minimize screen errors and adjust VR12 to minimize screen errors.
9. Change the ECC Sample on the TEST/RF Menu to fast
10. Memorize the spectrum waveform on TP8 into the "B" memory of the HP8591A Spectrum Analyzer.
11. Next adjust VR613 & 611 to reduce the error rate further. Turn VR613 very slightly in the direction which reduces the INNER ERROR RATE in the "CH0 A" bar graph. Then adjust VR611 very slightly in the opposite direction CCW to reduce the error further. Continue this alternate adjustment of the pots until no more improvement is possible.
12. Repeat this same adjustment technique starting with VR612 and following with VR610, in order to minimize the INNER ERROR RATE on the "CH0 B" bar graph.
13. Recall the previously memorized waveform in the Spectrum Analyzer "B" memory, and compare it to the waveform now present on TP8. If the two waveforms aren't similar in appearance, adjust the two pairs of pots 613/611 (CHA) & 612/610 (CHB) in the manner described above, for minimum error rate for both heads, and similar spectrum waveshapes.
14. Adjust VR608 & 609 to minimize the "sawtooth" appearance of the spectrum waveform at the 5Mhz end.
15. Adjust VR10 & VC301 to further reduce the Inner Error Rate.

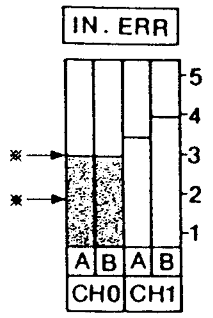






16. Confirm the error rate is less than 10-4 (scale 3).

⦸ CONFIRMATION



TYPICAL VALUE: Error rate is less than scale 3.

Note: After equalization adjustment, RF envelope output level adjustment is required as follows.

1. Connect the scope to TP8 and place the unit in PLAY mode.
2. Adjust VR608 and VR609 so that the output envelope is 400mVp-p. (50Ω terminated).
3. Connect the scope to WFM out and adjust VR11 so that the output envelope is 200mVp-p (75Ω terminated).

5-7. WFM OUT CONFIRMATION (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	EYE : 200mV ± 50mV
TEST	WFM OUT
MODE	VAR × 1
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR11 (AUTO EQ IN LEVEL)[E1]

<STEP 1>

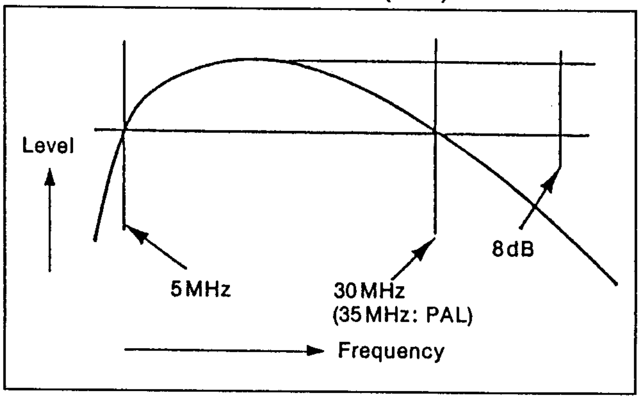
1. Connect the scope to VFM OUT on the rear panel through 75Ω termination.
2. Set the Front Menu to WFM ENV mode.
3. Confirm the ENVELOPE level is 900mV ± 200mV.
4. Set the Front Menu to WFM EYE mode.
5. Adjust VR11 (AUTO EQ IN LEVEL) so that the level is 200mV ± 500mV.

FINAL CONFIRMATION

SPEC	Refer to figure
TEST	TP8 [E2], TP400 [f4]
MODE	VAR × 1
TAPE	SHUFFLING OFF 75% COLOR BAR
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR3, VR610, VR611, VR612, VR613, VC1,

1. Set the spectrum analyzer as shown in item 5-5.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP400.
4. Confirm that the output spectrum is as shown in figure.
5. If it is not, readjust VR3, VC1, VC2 (PHASE), VR610, VR612, VR611 and VR613 (LEVEL).

5MHz = 30MHz ± 2MHz (NTSC)
35MHz ± 2MHz (PAL)



7. CUE AUDIO (S3) BOARD MODE CONDITION

Set the Switches on the AUDIO IN.OUT P.C.B. and set the MENU condition.

INPUT ATT SELECT SW ..... 4dBm (on the AUDIO IN/OUT Board)
OUTPUT ATT SELECT SW ... 0dBu (on the AUDIO IN/OUT Board)
INPUT IMPEDANCE SW ...... HIGH (on the AUDIO IN/OUT Board)

MENU CONDITION

AUDIO IN MENU

Select the CUE AUDIO LEVEL
to "UNITY" : F5

AUDIO OUT MENU

Select the CUE AUDIO LEVEL
to "UNITY" : F5

7-1. MASTER OSC DRIVE VOLTAGE ADJUSTMENT (S3 : CUE AUDIO)

SPEC	21V ± 0.1V DC
TEST	TP1[I5]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (21V ADJ.)[I4]

<STEP 1>
1. SCOPE : TP1
2. Place the unit in the RECPLAY mode.
3. Adjust VR1 so that the DC voltage is 21V ± 0.1V DC.

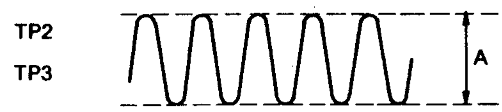
7-2. MASTER OSC ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP2 - 70kHz ± 0.2kHz, 5.5Vpp ± 1.0V TP3 - 5.5Vpp ± 1.0V
TEST	TP2[H2], TP3[G2]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	FREQUENCY COUNTER, OSCILLOSCOPE
INPUT	
ADJ.	T1[H2], T1 on S3 SUB2

<STEP 1>
1. FREQUENCY COUNTER : TP2
2. Place the unit in the RECPLAY mode.
3. Adjust T1 so that the OSC frequency is 70kHz ± 0.2kHz.

<STEP 2>
1. SCOPE CH1 : TP2
   CH2 : TP3
2. Place the unit in the RECPLAY mode.
3. Confirm that the OSC frequency level A is 5.5 ± 1.0V p-p as shown in Figure.

⊘ CONFIRMATION



A=5.5Vp-p±1.0V

<STEP 3>
1. Scope CH1 : PIN 6 of S3 SUB2
2. Adjust T1 on S3 SUB2 so that the OSC level becomes maximum.

<STEP 4>
1. SCOPE CH1 : PIN 6 of S3 SUB2
   CH2 : PIN 7 of S3 SUB2
2. Confirm the OSC level is 5.5Vpp ± 1V.
3. Confirm the frequency is 140 kHz ± 5kHz.

7-3. FULL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

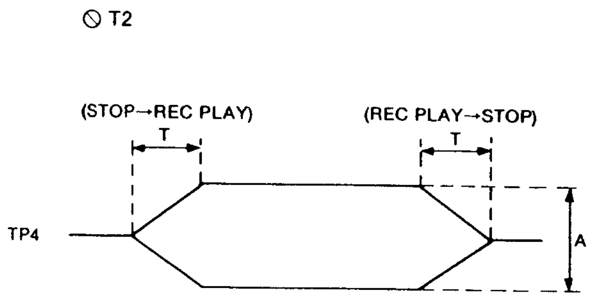
SPEC	TP4:more than 508mVp-p,T=30msec±10msec
TEST	TP4[H1], P205 21A --- Trigger
MODE	RECPLAY, RECPLAY ↔ STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE (STORAGE)
INPUT	
ADJ.	T2[I1]

<STEP 1>

1. SCOPE : CH1 : TP4
   CH2 : 21A of P205 --- Trigger
2. Place the unit in RECPLAY mode.
3. Adjust T2 so that the signal level A is maximum.
4. Confirm that level A is more than 508mVp-p.

<STEP 2>

1. Place the unit moving to RECPLAY from STOP mode and moving to STOP from RECPLAY mode.
2. Confirm that the rising and falling period of the waveform is 30ms ± 10ms as shown in Figure.



SPECIFICATION:
A=more than 508mVp-p
T=30msec±10msec

P205 21A (Trigger)
10msec
DELAY 130msec

7-4. CUE ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

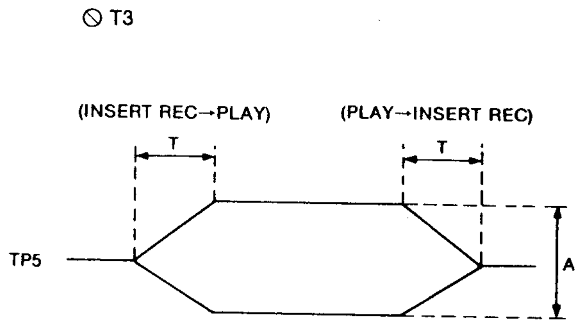
SPEC	TP5:more than 508mVpp, T=30msec±10msec
TEST	TP5[G2], P205 22A --- Trigger
MODE	INSERT REC ↔ PLAY (CUE ON)
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T3[G1]

<STEP 1>

1. SCOPE : CH1 : TP5
   CH2 : 22A of P205 --- Trigger
2. Place the unit in INSERT CUE REC mode.
3. Adjust T3 so that the signal level A is maximum.
4. Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 2>

1. Place the unit moving to INSERT REC from play and moving to play from INSERT REC mode.
2. Confirm that the rising and falling period of the waveform is 30ms ± 10ms as shown in Figure.



SPECIFICATION:
A=more than 508mVp-p
T=30msec±10msec

P205 22A (Trigger)
10msec/DIV
DELAY 130msec

7-5. T/C ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP6:more than 508mVpp, T=30msec±10msec
TEST	TP6 (T/C ERASE)[F2], P205 22B --- Trigger
MODE	INSERT REC, ASSEMBLE REC ASSEMBLE REC ↔ PLAY
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T4 (T/C ERASE)[F1]

<STEP 1>

MENU CONDITION

MAN - EDIT MENU INSERT "ON"
Select the TC F10 to "ON".

<STEP 2>

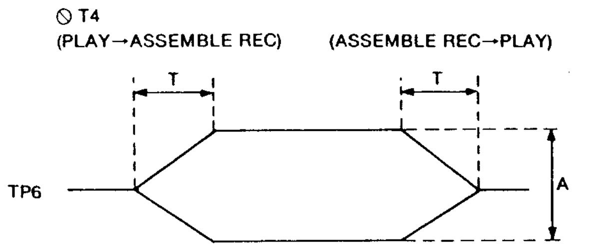
1. SCOPE : CH1 : TP6
   CH2 : P205 of 22B --- Trigger
2. Place the unit in INSERT REC mode.
3. Adjust T4 so that the signal level A is maximum.
4. Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 3>

1. Place the unit in ASSEMBLE RECORDING mode.
2. Confirm that the signal level A is more than 508mVp-p.
3. If it is not, Adjust T4 so that the level A is more than 508mVp-p as shown in Figure.

<STEP 4>

1. Place the unit moving in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
2. Confirm that the rising and falling period of the waveform is 30msec ± 10msec as shown in Figure.



SPECIFICATION:
A = more than 508mVp-p
T = 30msec ± 10msec

22B of P205 (Trigger)
10msec/DIV
DELAY 130msec

7-6. CTL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP7=more than 508mVpp,T=30msec±10msec
TEST	TP7[D2], P205 22C --- Trigger
MODE	ASSEMBLE REC to PLAY, PLAY to ASSEMBLE REC
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T5[D1]

<STEP 1>

MENU CONDITION

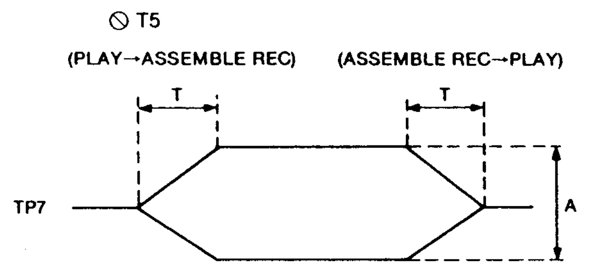
MAN - EDIT MENU ASSEMBLE

<STEP 2>

1. SCOPE : CH1 : TP7
   CH2 : P205 of 22C --- Trigger
2. Place the unit in ASSEMBLE REC mode.
3. Adjust T5 so that the signal level A is maximum.
4. Confirm that level A is more than 508mVp-p as shown in Figure.

<STEP 3>

1. Place the unit in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
2. Confirm that the rising and falling period of the waveform is 30 ± 10msec as shown in Figure.



SPECIFICATION:
A = more than 508mVp-p
T = 30 ± 10msec

7-7. T/C BIAS & SIGNAL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP8 BIAS CURRENT A = 62mVpp ± 3mV SIGNAL CURRENT B = 5mVpp±0.2mV
TEST	TP8[I3], TP10[H4], TP11[I4]
MODE	ASSEMBLE REC
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE, PROBE 1:1
INPUT	
ADJ.	T6[I2], VR2 (T/C BIAS CURRENT)[I3] VR4 (T/C SIGNAL CURRENT)[G4]

<STEP 1>

MENU CONDITION

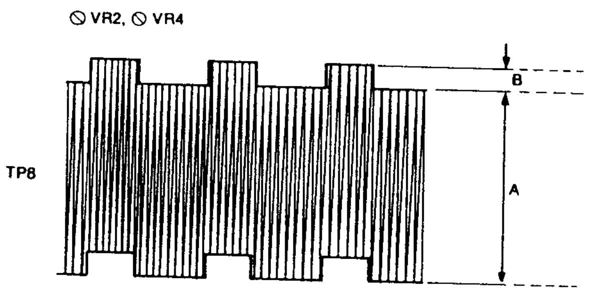
MAN - EDIT MENU ASSEMBLE

<STEP 2>

1. SCOPE : TP8
2. Place the unit in ASSEMBLE REC mode.
3. Adjust T6 so that the signal level A is maximum.

<STEP 3>

1. SCOPE : TP10, TP11 (probe GND)
2. Place the unit in ASSEMBLE REC mode.
3. Adjust VR2 so that the BIAS CURRENT LEVEL A is 62mVpp ± 3mV as shown in Figure.
4. Adjust VR4 so that the SIGNAL CURRENT LEVEL B is 5mVpp ± 0.2mV as shown in Figure.



SPECIFICATION:
⦸ VR2 BIAS CURRENT A=62mVp-p±3mV
⦸ VR4 SIGNAL CURRENT B=5mVp-p±0.2mV

7-8. CUE BIAS CURRENT ADJUSTMENT (1)(S3 : CUE AUDIO)

SPEC	TP9 : MAXIMUM, CUE OUT : MAXIMUM
TEST	TP9[F3], CUE OUT
MODE	REC PLAY, REC PLAY ↔ PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	1kHz +4dBm Sinewave signal to CUE IN
ADJ.	T7[F3], VR3 (CUE BIAS CURR.)[G3]

<STEP 1>

1. SCOPE : TP9
2. Place the unit in REC PLAY mode.
3. Adjust T7 so that the signal level is maximum.

T7 Signal Level = maximum

<STEP 2>

1. SCOPE : CUE OUT
2. Place the unit repeat moving in REC PLAY from PLAYBACK and in PLAYBACK from REC PLAY mode.
3. Adjust VR3 so that the signal level is maximum.

7-9. EE LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP13:-12dBm±0.2dB, CUE OUT:4dBm±0.2dB
TEST	TP13[B3], CUE OUT
MODE	EE (EJECT)
TAPE	
M.EQ	VTVM
INPUT	1kHz 4dBm Analog Sinewave signal to CUE IN
ADJ.	VR6 (EE LEVEL)[B3], VR7 (EE OUT LEVEL)[A3]

4000 SERIES

<STEP 1>

MACHINE CONDITION

IN/OUT ATT SW (on Audio IN/OUT P.C.B) : +4dBm

INPUT IMPEDANCE : 600Ω

AUDIO IN MENU : UNITY

<STEP 2>

VTVM : TP13

Adjustment VR : VR6

SPECIFICATION : -12dBm ± 0.2dB

<STEP 3>

VTVM : CUE OUT

Adjustment : VR7

SPECIFICATION : 0dBu ± 0.2dB

7-10. PLAYBACK EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz~1kHz = -3dB~+1.5dB 1kHz~15kHz = 1.0dB, 1kHz 0dB Reference
TEST	TP16 [C3]
MODE	PLAY
TAPE	AUDIO FREQUENCY RESPONSE ALIGNMENT TAPE
M.EQ	VTVM
INPUT	
ADJ.	VR10 (PB EQ)[C1]

<STEP 1>

1. VTVM : TP16
2. Play back the Alignment Tape.
3. Adjust VR10 so that the Playback level is within the specification as shown.

SPECIFICATION:

50Hz ~ 1kHz = -3dB ~ +1.5dB

1kHz ~ 15kHz = ± 1.0dB

(1kHz 0dB Reference)

7-11. PLAYBACK LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 = -12dB±0.2dB, CUE OUT:0dBu± 0.2dB
TEST	TP16[C3], CUE OUT
MODE	PLAY
TAPE	ALIGNMENT TAPE 1KHz 0VU PORTION
M.EQ	VTVM
INPUT	
ADJ.	VR11 (PB LEVEL)[B2], VR12 (PB OUT LEVEL[C3]

<MACHINE CONDITION>

1. Output ATT : 4dBm
2. Audio out Cue : UNITY (MENU)

<STEP 1>
1. VTVM : TP16
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR11

SPECIFICATION : -12dBm ± 0.2dB

<STEP 2>
1. VTVM : CUE OUT
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR12

SPECIFICATION : 4dBm ± 0.2dB

7-12. CUE BIAS CURRENT ADJUSTMENT (2)(S3 : CUE AUDIO)

SPEC	TP16:-12dBm ± 0.2dB, CUE OUT AUDIO DISTORTION IS LESS THAN 3%
TEST	TP16[C3], CUE OUT
MODE	REC PLAY ↔ PLAY
TAPE	BLANK TAPE
M.EQ	VTVM DISTORTION METER
INPUT	1kHz +4dBm, 1kHz +12dBm
ADJ.	VR8[A2]

<STEP 1>
1. VTVM : TP16
2. Supply a 1kHz +4dBm sine wave signal to CUE IN and Record.
3. Playback a just recorded portion.
4. Adjust VR8 so that the CUE BIAS CURRENT LEVEL is -12dBm ± 0.2dB.

TP16

SPECIFICATION: VR8 : -12dBm ± 0.2dB

<STEP 2>

1. DISTORTION METER : CUE OUT
2. Supply a 1kHz +12dBm sinewave signal to CUE IN and Recorded.
3. Playback a just recorded portion.
4. Confirm that the distortion is less than 3%.
5. If it is not adjust VR3 as follow as item 7-11. CUE BIAS CURRENT ADJUSTMENT (1) <STEP 2>.

CUE OUT

SPECIFICATION: AUDIO DISTORTION : less than 3%

7-13. REC EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz~1kHz = -3dB~+1.5dB 1kHz~15kHz = 1.0dB (1kHz 0dB Reference)
TEST	CUE OUT
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	-6dBm, SWEEP
ADJ.	VR14 (REC EQ 2)[B2], FL4[A2], VR9[A2]

<STEP 1>

1. VTVM : CUE OUT
2. Supply a difference frequency sinewave as shown below and record.
3. Playback a just recorded portion.
4. Adjust VR14, FL4 and VR9 so that the Playback level is within the specification.

INPUT LEVEL: -6dBm 1kHz (Reference)
-6dBm SWEEP as shown below

SPECIFICATION: 50Hz ~ 1kHz = -3dB ~ +1.5dB
1kHz ~ 15kHz = ± 1.0dB
(1kHz -6dBm Reference)

Adjustable frequency
VR14 and FL4 : 5kHz ~ 12.5kHz
VR9 : 12.5kHz ~ 15kHz

7-14. RECORDING LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 : -12dBm ± 0.2dB
TEST	TP16[C3]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	1kHz 4dBm Sinewave Signal to CUE IN
ADJ.	VR8[A2]

<STEP 1>

1. VTVM : TP16
2. Supply a 1kHz 4dBm sinewave signal to CUE IN and Record it.
3. Playback a just recorded portion.
4. Adjust VR8 so that the level is -12dBm ± 0.2dB.

SPECIFICATION: -12dBm ± 0.2dB

7-15. CUE METER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	CUE METER -20dB
TEST	CUE METER
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 4dBm Sinewave Signal to CUE IN
ADJ.	VR13[C4]

<STEP 1>

Note: Before this adjustment, CUE METER OFFSET (item 12-3) is required.

1. Supply a 1kHz 4dBm sinewave signal to CUE IN.
2. Adjust VR13 so that the meter level is -20dB.

7-16. CUE MIX ADJUSTMENT (S3 : CUE AUDIO)

SPEC	+4dBm±0.5dBm(NTSC)
TEST	CUE OUT
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 4dBm Sinewave Signal to CUE IN
ADJ.	VR5[B4]

<STEP 1>

1. Supply a 1kHz 0dBu sinewave signal to CUE IN.
2. Set the VTR in to the CUE DMIX mode as shown below.

   AUDIO IN → SET UP → CH MIX ON → (CURSOR CENTER) → set the CH-1 S

3. Adjust VR5 so that the cue output level is 4dBm ± 0.5dBm.

8. AT (S4) BOARD

MACHINE CONDITION

1. Disconnect the P523 on the H.A. REGULATOR (S) P.C.B. which is located at right side of the Mechanism. while adjustment 8-1 through 8-6.
   Connect P523 from adjustment 8-7.

MENU CONDITION
TEST MENU
↓
AT SERVO TEST MENU

Set the each functions as follow.
1. F4: SEARCH = "CENTER"
2. F5: PATTERN = "ENABLE"
3. F8: AT HEIGHT = Ach "0"
   Bch "0"
4. SW2601 [D2] on S4 board is OPEN.
5. Error correction switches on L3 board are all OFF.
6. Error concealment switch on L4 board is OFF.

8-1. ENVELOPE DETECTION ADJUSTMENT (S4 : AT)

SPEC	0.7V ± 0.1VDC, PEAK = +3V ±0.1VDC
TEST	TP2611 (ENV CH1)[D1], TP2612 (ENV
MODE	STOP, EJECT, SW2601=OPEN, P523=OFF SEARCH = CENTER, PATTERN = ENEBLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2601[F2], VR2603[D4], VR2602[F2], VR2604[E4]

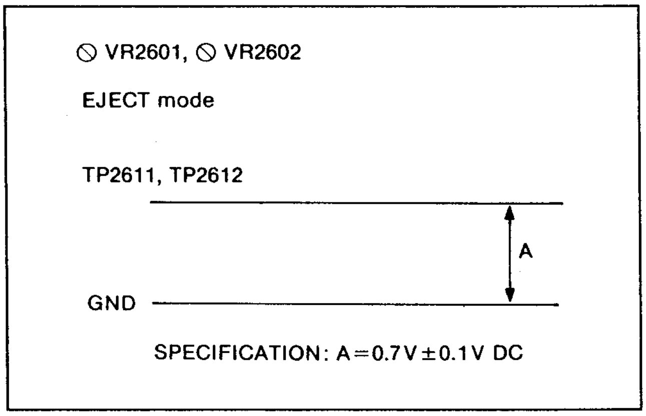
<STEP 1>

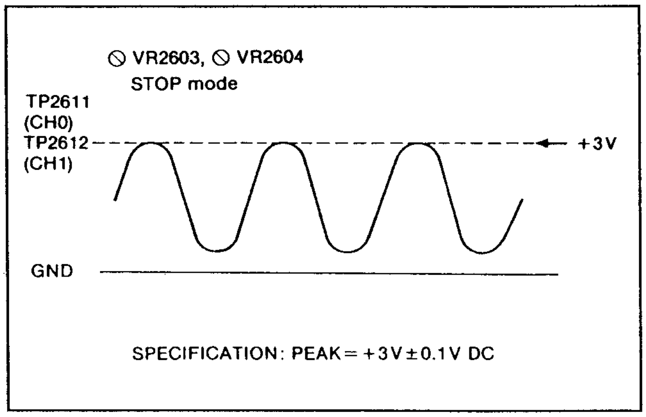
MENU CONDITION

Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. P523 = OFF

<STEP 2>
1. SCOPE : CH1 TP2611
   SCOPE : CH2 TP2612
2. Set the VTR in EJECT mode.
3. Adjust VR2601 and VR2602 so that the level of waveform is 0.7V ± 0.1 V DC.

<STEP 3>
1. SCOPE : CH1 TP2611
   SCOPE : CH2 TP2612
2. Set the VTR in STOP mode.
3. Rotate the capstan shaft by hand, and set the waveform peak becomes maximum.
4. Adjust VR2603 and VR2604 so that the level of waveform is 3V ± 0.1V DC.
5. Note that VR2601/VR2602/VR2603/VR2604 effect each other.
   Repeat step 2 and 3 and confirm that each adjustment is in specification.





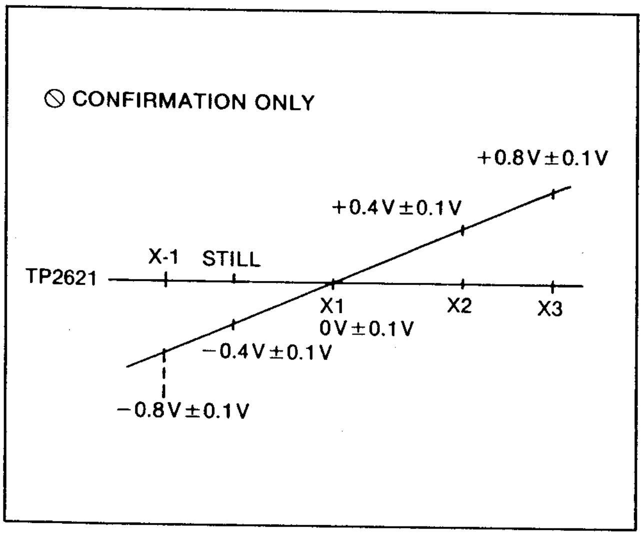
8-2. CONFIRMATION OF GROUP DELAY COMPENSATION CIRCUIT (S4: AT)

SPEC	REFER TO FIGURE
TEST	TP2621[H3]
MODE	VAR (X-1, STILL, X1, X2, X3), SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>
MACHINE CONDITION
Refer to the Machine condition and Menu condition at the beginning of this section.

<STEP 2>
Connect the scope to TP2621

<STEP 3>
Set the VTR VAR X-1, STILL, X1, X2 and X3 and confirm the each DC voltage is shown below.



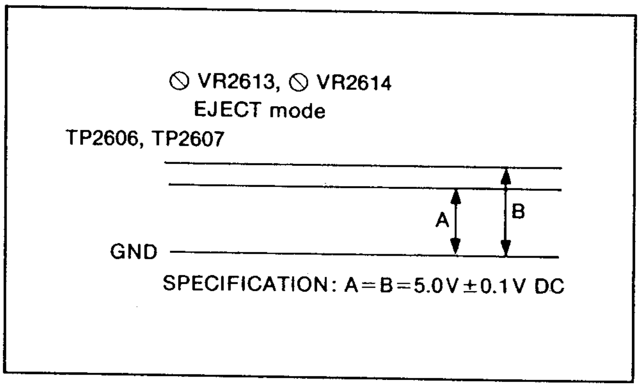
<STEP 4>
The DC level of VAR X3 mode should be stable more than 20 sec.

8-3. D/A CONVERTER FULL SCALE ADJUSTMENT (S4 : AT)

SPEC	5.0V ± 0.1VDC
TEST	TP2606 [B1], TP2607 [B2]
MODE	EJECT SW2601-OPEN, P523-OFF, SEARCH-CENTER, PATTERN-FIX
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2613 (DA1FS)[B2], VR2614 (DA2FS)[B2]

<STEP 1>
MACHINE CONDITION
1. Set the VTR in EJECT mode.
2. Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.

<STEP 2>
1. SCOPE CH1 : TP2606
   SCOPE CH2 : TP2607
2. Adjust VR2613 and VR2614 so that the voltage at TP2606 and TP2607 are +5V ± 0.1V DC.
3. Adjust VR2613 and VR2614 so that the difference voltage between TP2606 and TP2607 are within 0.05V. If the both voltage at TP2606 and TP2607 are 5.0V DC, then it is OK. If the one of the voltage is 4.9V adjust the other level is same level.
4. Note that the VR2613 and VR2614 effect each other.



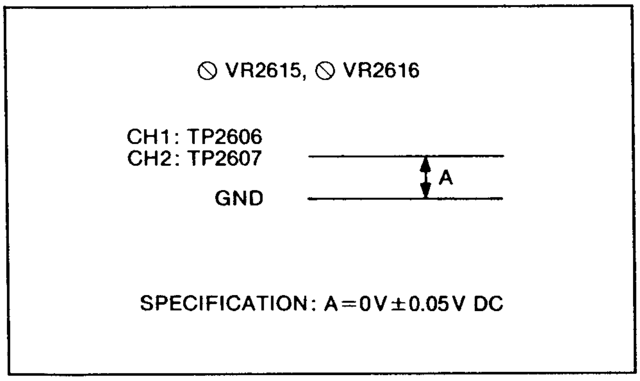
8-4. D/A CONVERTER OFFSET ADJUSTMENT (S4 : AT)

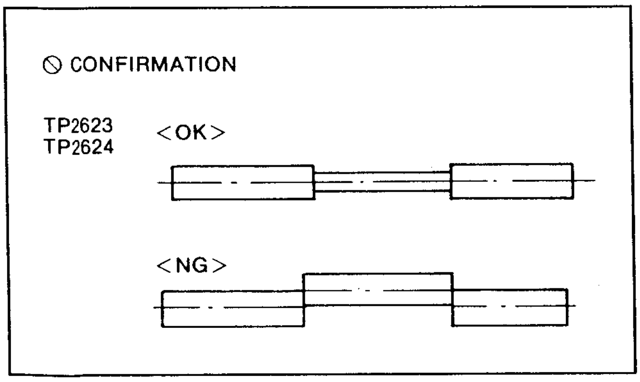
SPEC	TP2606 - TP2607 = 0V ± 0.05V DC
TEST	TP2606[B1], TP2607[B2], TP2623[D1], TP2624[E1], TP2619[E1] ... TRIGGER
MODE	VAR X1, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = FIX
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2615 (DA10S)[B2], VR2616 (DA20S)[B2]

<STEP 1>
MACHINE CONDITION
1. Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.
2. Set the VTR in VAR X1 mode.

<STEP 2>
1. SCOPE CH1 : TP2606
   CH2 : TP2607
2. Adjust VR2615 and VR2616 so that their voltage are 0V ± 0.05V DC.

<STEP 3>
1. SCOPE CH1 : TP2623
   CH2 : TP2624
2. Confirm the waveform center is flat.





8-5. OPEN GAIN ADJUSTMENT (S4 : AT)

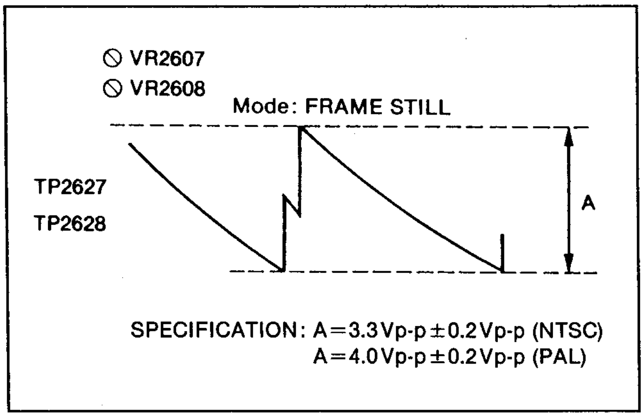
SPEC	TP2627- TP2628 = 3.3Vpp ± 0.2Vp-p
TEST	TP2627[I1], TP2628[I1]
MODE	VAR, SPEED : FRAME STILL, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2607[F1], VR2608[G1]

<STEP 1>
MACHINE CONDITION

<STEP 2>
MENU CONDITION
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION.

<STEP 3>
1. SCOPE : TP2627
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2607 so that the waveform level A is 3.3Vp-p ± 0.2Vp-p as shown in Figure.

<STEP 4>
1. SCOPE : TP2628
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2608 so that the waveform level A is 3.3Vp-p ± 0.2Vp-p as shown in Figure.

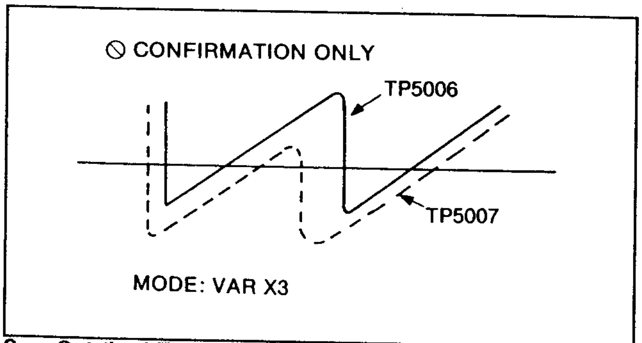


8-6. DRIVE WAVEFORM CONFIRMATION (S4 : AT)

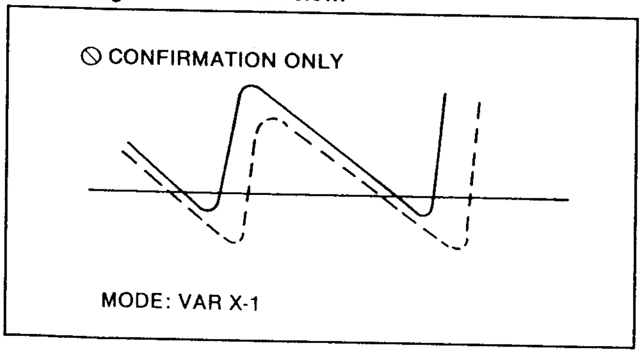
SPEC	REFER TO FIGURE
TEST	TP5006, TP5007 (HEAD AMP REGURATOR BOARD)
MODE	VAR X3, VAR X-1, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>
MACHINE CONDITION
Set the Machine condition as shown in the first page of this section.

<STEP 2>
1. SCOPE CH1 : TP5006
   CH2 : TP5007 on H.A.REGURATOR BOARD
   The H.A.REGURATOR BOARD is located at right side of mechanism.
2. Set the VTR in VAR X3 mode and confirm the drive voltage is as shown below.



3. Set the VTR in VAR X-1 mode and confirm the drive voltage is as shown below.



4. Turns power off and connect P523.

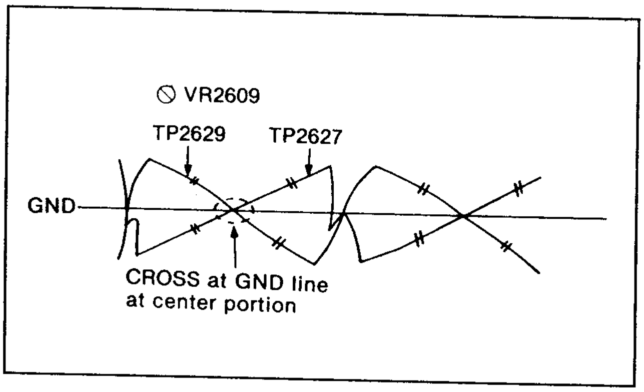
8-7. STRAIN SENSOR OUTPUT ADJUSTMENT (A CH)(S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2627[I1], TP2629[G1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL, SW2601=OPEN,P523=ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2609 (STR OS A)[G1]

<STEP 1>
1. Confirm the P523 is connected.
2. Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>
1. Press VAR button and set the speed to STILL (FIELD STILL).
2. SCOPE CH1 : TP2627
   CH2 : TP2629
   TRIGGER : TP2619

<STEP 3>
1. Rotate the capstan shaft by hand and set the waveform of TP2627 crosses to GND at center of the slope.
2. Adjust VR2609 so that the TP2629 and TP2627 waveform crosses to GND at their center of the waveform.



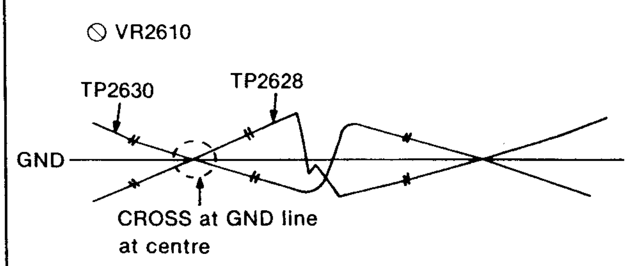
8-8. STRAIN SENSOR OUTPUT ADJUSTMENT (B CH)(S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2628[I1], TP2630[H1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL, SW2601=OPEN,P523=ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2610 (STR OS B)[H1]

<STEP 1>
1. Confirm the P523 is connected.
2. Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>
1. Press VAR button and set the speed to STILL (FIELD STILL).
2. SCOPE CH1 : TP2628
   CH2 : TP2630
   TRIGGER : TP2619

<STEP 3>
1. Rotate the capstan shaft by hand and set the waveform of TP2628 crosses to GND at center of the slope.
2. Adjust VR2610 so that the TP2630 and TP2628 waveform crosses to GND at their center of the waveform.



8-9. STRAIN SENSOR GAIN ADJUSTMENT (S4 : AT)

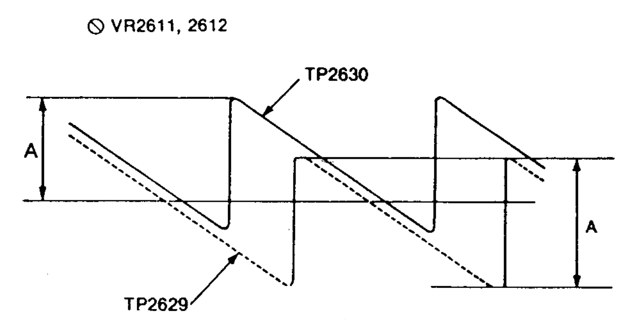
SPEC	TP2630 = TP2629 = 3.3VPP ± 0.5V
TEST	TP2629[G1], TP2630[H1]
MODE	JOG, SPEED : FRAME STILL, SW2601 = OPEN, P523 = ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[G1]

Connect P523

<STEP 1>
MENU CONDITION
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. Do not remove P523.

<STEP 2>
1. SCOPE : TP2629
2. Playback a 75% color bar portion of the Alignment Tape in FRAME STILL mode.
3. Adjust VR2611 so that the waveform level A is 3.3Vpp ± 0.5V as shown in Figure.

<STEP 3>
1. SCOPE : TP2630
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2612 so that the waveform level A is 3.3Vpp ± 0.5V as shown in Figure.



SPECIFICATION: A=3.3Vp-p±0.5V (NTSC)
A=4.0Vp-p±0.5V (PAL)

8-10. AT HEIGHT (1) ADJUSTMENT (S4 : AT)

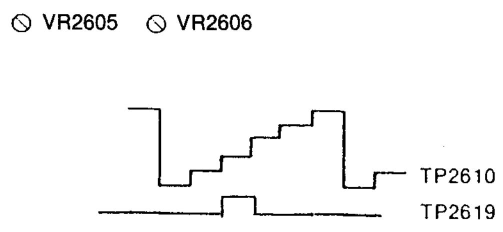
SPEC	TP2619 PULSE IS LOCATED As shown in figure.
TEST	TP2610[F1], TP2619[F1], TP5006[C2], TP5007 (H.A REGULATOR S)[C1] TP2606, TP2607
MODE	VAR×1, SW2601=OPEN, P523-ON, SEARCH=CENTER, PATTERN=ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2605[F1], VR2606[F1]

<STEP 1>
SCOPE CH1 : TP2610 Segment Pattern
SCOPE CH2 : TP2619 Pulse
SCOPE CH3 : TP5006 Drive Voltage
SCOPE CH4 : TP5007 Drive Voltage

<STEP 2>
1. Field or Frame Still Option (Setup/Home/AT Play)
2. Center/Enable (Test/Servo/AT)
3. SW2601 open
4. Variable X1 Playback
5. 75% Color Bar Alignment tape, shuffling ON
6. Zero the AT Head Heights from the front panel. (Height ON/ BS with F9/left & right cursors, with the front panel knob).

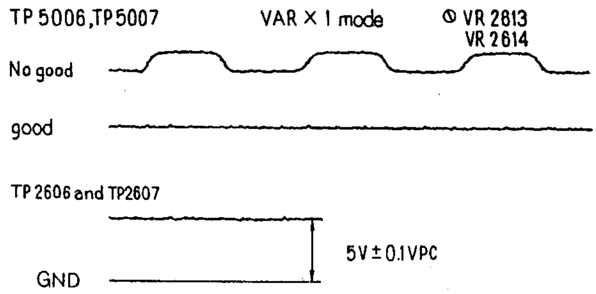
<STEP 3>
1. Initially, adjust the deflection pattern voltages at TP5006 & 5007 are 0 volts DC by VR2605 & VR2606 during VAR X1 playback. This centers the AT heads.
2. Next, fine adjust these pots to achieve three conditions
   A). Proper rising stairstep and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the highest step.
   B). Maximum RF on the 4 "Envelope" bar graphs on the Test/Servo/AT screen.
   C). The segment LED D609 on the AT board should be off.
3. The drive voltage at TP5006 & 5007 will have changed, but they should still be within the range of zero volts, plus or minus fifty volts.
4. Note the voltages at TP5006 & 5007 for use in subsequent adjustments.

Note:
1. In this adjustment if output drive voltage waveforms(TP5006 and TP5007) are not flat like a pulse. VR2613 and VR2614 adjustments are required as shown in Figure.



SPECIFICATION: TP2619 pulse is located at the third step of TP2610

2. Place the unit in VAR × 1 mode.
3. Adjust VR2613 and VR2614 so that the output waveform are flat as shown in Figure.
4. Confirm that the voltage at TP2606 and TP2607 are +5V ± 0.1VDC. (8-3. D/A CONVERTER FULL SCALE ADJUSTMENT)



8-11. AT HEIGHT (2) ADJUSTMENT (S4 : AT)

SPEC	TP2619 PULSE IS LOCATED AT PEAK OF TP2610
TEST	TP2610[F1], TP2619(TRIGGER)[E1], TP5006[C2], TP5007(H.A REGULATOR S)[C1] TP2629, TP2630
MODE	VAR, SW2601-CLOSE, P523-ON, SEARCH = CENTER, PATTERN= ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609 (STR OS A)[G1], VR2610 (STR OS B)[H1]

This adjustment will be done in the open loop and closed loop modes.

<STEP 1>

OPEN LOOP MODE

1. 75% color bar alignment tape
2. SW2601 OPEN
3. AT menu Screen Options; CENTER/ENABLE
4. Variable X1 playback

<STEP 2>

1. SCOPE CH1 : TP2629
   SCOPE CH2 : TP2630
   (Strain Offset pots)
   VR2609
   VR2610
   (Strain Offset pots)

<STEP 3>

1. Adjust VR2609 &2610 ("STROSA" & "STROSB") for 0 volts at TP2629 & 2630.

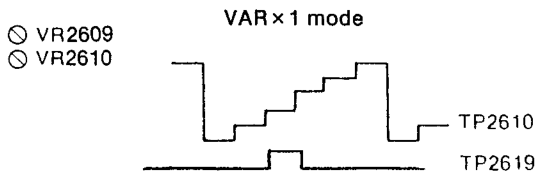
CLOSED LOOP MODE

<STEP 4>

1. Close the strain loop with SW2601.
2. Continue in Variable X1 playback.
3. While monitoring TP5006 & 5007, adjust the Strain Offsets VR2609 & 2610 for the voltages noted at in step (8-10).

<STEP 5>

1. Now, fine adjust VR2609 & 2610 for three conditions;
   A). Proper rising stairstep and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the highest step.
   B). Maximum RF on the 4 "envelope" bar graphs on the Test/Servo/AT screen.
   C). Zero volts plus or minus 50 volts at test points 5006 & 5007.



SPECIFICATION: TP2619 pulse is located at the third step of TP2610

<STEP 6>

Repeat section 8-10, 8-11 until front panel envelope does not change when SW2601 is opened and closed.

8-12. GAIN ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619 (TRIGGER[E1] TP5006[C2],TP5007[C1] TP8 (S1) TP8 (S2) TP207 on REC Amp
MODE	VAR×1, FRAME STILL, SW2601 = CLOSE, H.A REGULATOR, P523 = ON, SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[H1]

<STEP 1>

1. AT Play "Frame" option on the SET UP/HOME screen or TEST/SERVO/AT screen.
2. CENTER/ENABLE on the Test/Servo/AT screen.
3. 75% color bar tape
4. Place the unit to STILL mode.
5. Set the AT head heights to zero from the front panel.

<STEP 2>

1. SCOPE CH1 : TP2610 Segment Pattern
   SCOPE CH2 : TP2619 Pulse
   VR2611 "STRGNA"
   VR2612 "STRGNB"

<STEP 3>

1. Adjust VR2611 & 2612 for Maximum RF level on the "envelope" bar graphs on the front panel while maintaining the proper timing relationship between the pulse and Segment waveforms, at the fourth step.
2. As a rough check, the voltage in the play mode should be approximately 0 volts at TP5006 & 5007, and the segment LED should be off.

<STEP 4>

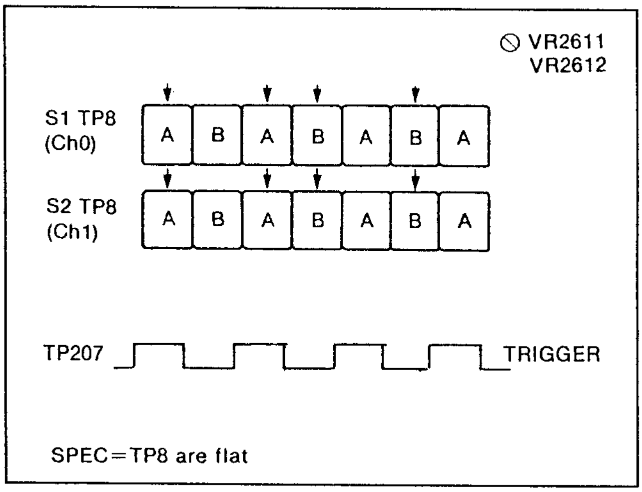
1. Next, fine adjust the circuit as follows;
2. AT Play "Frame" on the SETUP/HOME screen or TEST/SERVO/AT screen.
3. CENTER/ENABLE
4. SW2601 CLOSED
5. Variable STILL mode (not play Still).

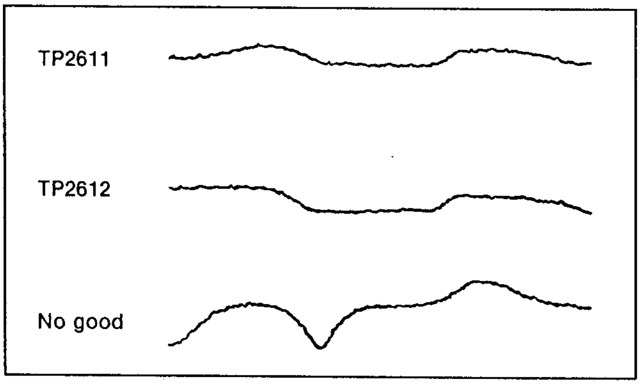
<STEP 5>

1. SCOPE CH1 : TP8 on the S1 board
   SCOPE CH2 : TP8 on the S2 board
   TP207 for triggering
   (on the REC Amp Board).
2. Fine adjust VR2611 & 2612 for flatness in the detected envelope, and maximum envelope level on the front panel meter.

Note:

1. If output waveform of TP8 is not clear, connect the scope to CH1 to TP2611 and CH2 to TP2612 on the AT board.
2. Confirm that output DC level is flat.





8-13. STRAIN LOOP FREQUENCY RESPONSE ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2629[G1] --- A CH WFM OUT TP2630[H1] --- B CH (ENVELOPE) TP2619[E1] --- (H SW) TRIGGER,
MODE	VAR X1, -X1, SW2601 = CLOSE, SEARCH=CENTER=PATTERN=ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	Composite color bar to VIDEO IN
ADJ.	VR2619(TWN A)[H2], VR2621(LGN A)[H2] - A CH VR2620(TWN B)[H2], VR2622(LGN B)[H2] - B CH

<STEP 1>

1. SCOPE CH1 : WFM OUT (ENV)
   CH2 : TP2619 (TRIG)
2. Set the each VRS as follows.
   VR2619, VR2620 : center position.
   VR2621, VR2622 : fully counterclockwise

<STEP 2>

1. Place the unit to VAR ×1 mode.
2. Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
3. Turn VR2619 and VR2620 to clockwise until output envelope waving is increase.
4. Adjust VR2619 and VR2620 to counterclockwise so that the output envelope waving is minimum.
5. Confirm that the SEGM lamp is OFF.
6. After confirmation, set the AT HEIGHT to 0.
7. Set the VR2621 and VR2622 to fully clockwise.

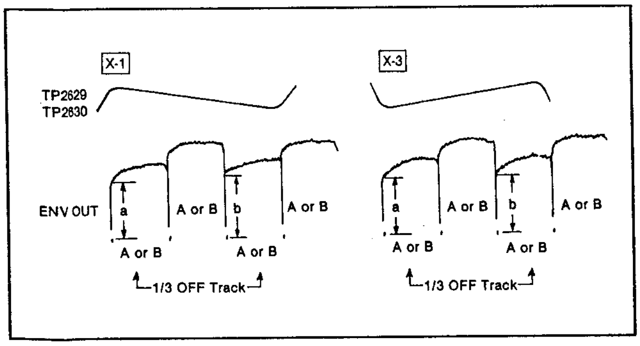
Note: Adjust each head (A,B) independently.

<STEP 3>

1. Scope CH1 : WFM OUT (ENV pattern)
   CH2 : TP2629, TP2630
   CH3 : TP2619 (TRIG)
2. Place the unit to VAR-X1 and VAR-X3.

<STEP 4>

1. Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
2. Adjust VR2621 and VR2622 so that the droop of entrance side of output envelope is same level between a and b.



<STEP 5>

1. Confirm that the SEGM lamp is OFF.
2. After confirmation, set the AT HEIGHT to 0.

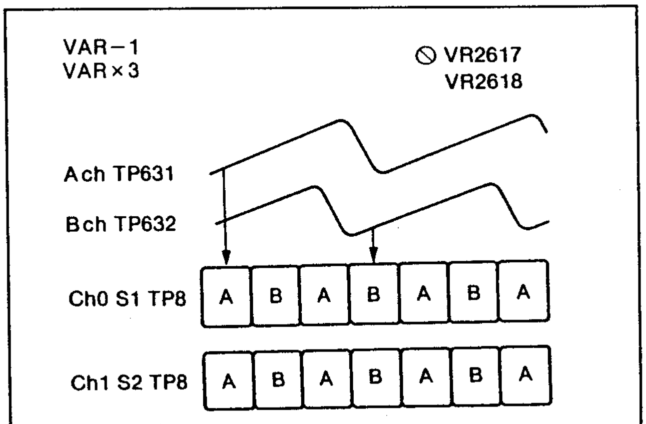
Note: Adjust each head (A,B) independently.

8-14. GROUP DELAY COMPENSATION ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP8[E2] → S1, TP8[E2] → S2, TP631[H2] → S4, TP632[I3] → S4
MODE	VAR × -1, × 3 → VAR ×1 ~ ×-3
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2617[D1], VR2618[E1]

<STEP 1>

1. AT Play Frame or Field.
2. SCOPE CH1 : TP8 on the S1 board.
   SCOPE CH2 : TP8 on the S2 board.
   SCOPE CH3 : TP2631
   SCOPE CH4 : TP2632
3. Use the knob to activate the variable times 3 and variable times -1 modes, alternately.



SPEC=Center position between (1) and (2)

4. Confirm that the output waveform is flat as shown in figure.
5. If it is not, adjust VR2617 and VR2618.

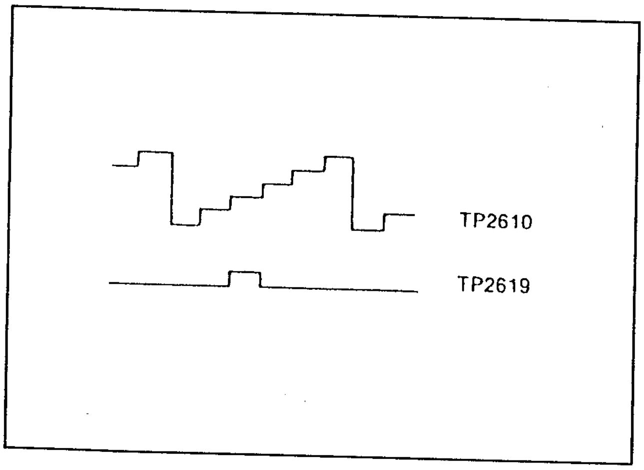
8-15. PRE READ CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	EDIT PLAY, SW2601-CLOSE, P523-ON AT TEST = NORMAL, PRE READ MODE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>
SCOPE CH1 : TP2610
SCOPE CH2 : TP2619

<STEP 2>
1. Set PRE READ mode as follows.
   HOME MENU → F+F8(PRE READ ON) → MANUAL EDIT MENU → F2 INSERT
2. PLAYBACK the Alignment Tape.

<STEP 3>
Confirm the pulse at TP2619 is located at 4TH (PAL), 3RD (NTSC) steps of TP2610 as shown below.

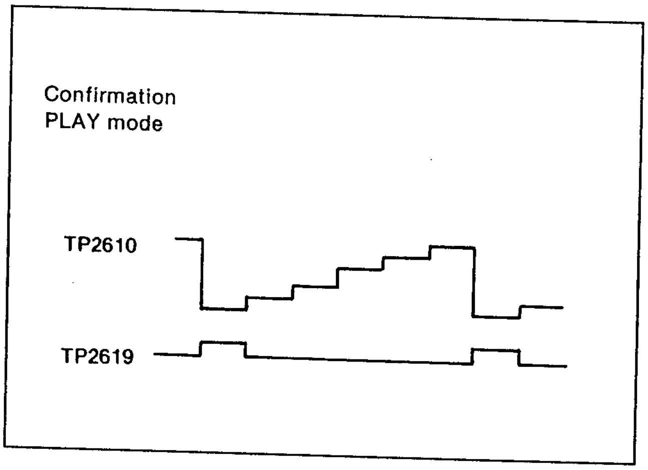


8-16. CONFIDENCE PB CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	CONFIDENCE PB HOME MODE, SW2601=CLOSE
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>
SCOPE CH1 : TP2610
SCOPE CH2 : TP2619

<STEP 2>
Confirm the pulse at TP2619 is located at Second steps of TP2610 as shown below.



FINAL CONFIRMATION OF AT ADJUSTMNET

SPEC	TP2619 PULSE IS LOCATED as shown in figure
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619(TRIGGER)[E1], TP5006, TP5007 (H.A REGULATOR)
MODE	VAR, FRAME STILL, SW2601 = CLOSE, P523 = ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR POSITION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609 (STR OS A),VR2610 (STR OS B)[H1] VR2611[G1], VR2612[H1]

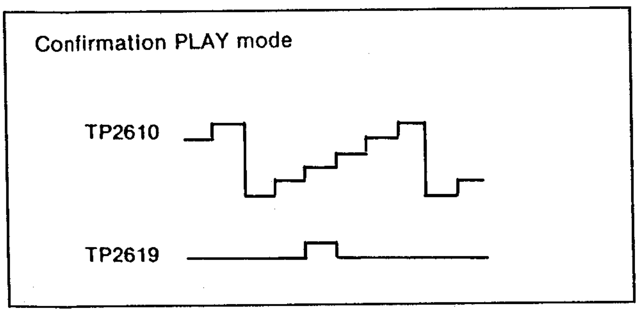
<STEP 1>

MACHINE CONDITION

1. VAR X1, P523 = ON, SW2601 = CLOSE
2. Set the AT mode, SEARCH = CENTER, PATTERN = ENABLE
3. Set the AT HEIGHT on the front panel, both A CH and B CH are 0.

<STEP 2>

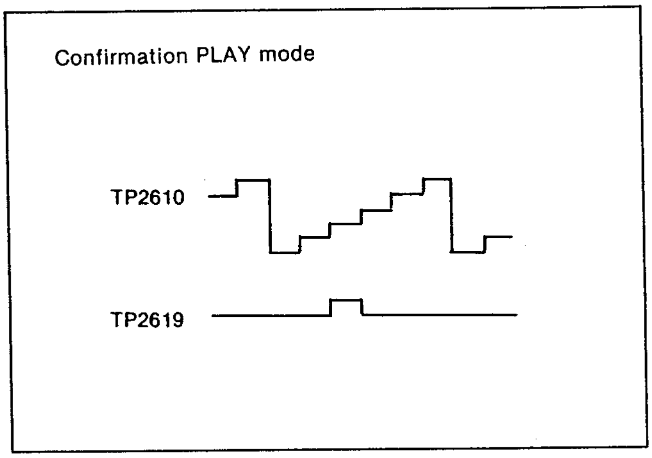
1. SCOPE CH1 : TP2610
   CH2 : TP2619
   CH3 : TP5006
   (H.A REGULATOR Board)
   CH4 : TP5007
   (H.A REGULRATOR Board)
2. Confirm the waveform is as shown in Figure.
   If it is not, adjust VR2609 and VR2610.
3. Confirm that the DC voltage is 0 ± 50V DC.
4. Confirm that the envelope output is maximum on the front display.
5. If it is not Readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) ADJUSTMENT)



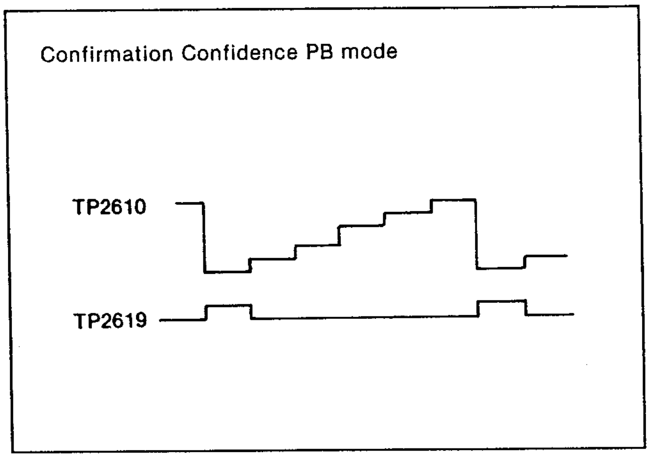
<STEP 3>

1. Set the AT mode to NORMAL (F1).
2. Place the unit in the PLAY mode.
3. Confirm the waveform is as shown in figure.

<STEP 4>



1. Place the unit in the Recording mode.
2. Confirm the waveform is as shown in figure.



3. If it is not, readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) adjustment)

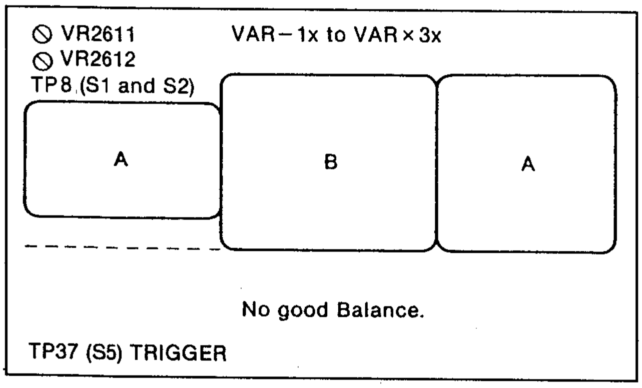
NOTE: If the segment steps is mached the pulse and segment, Segment LED is OFF.

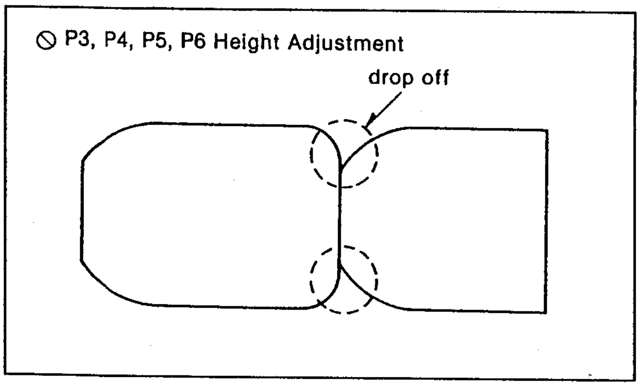
<STEP 5>

1. SCOPE CH1 : TP8 (S1) on the Equalizer Board.
   CH2 : TP8 (S2) on the Equaliger Board.
   CH3 : TP37 (S5) on the SERVO Board. (for trigger)
2. Confirm that the envelope is flat from VAR X-1 to VAR X3. And check the CH A and CH B envelope output balance.

Note: If the envelope drop off at entrance side and exit side, in this case re-check the tape pass linearity. (Refer to P3 or P6 Height adjustment)

3. If it is not, readjust VR2611 and VR2612. (Refer to item 8-15 GAIN adjustment)





9. SERVO (S5) BOARD

9-1. CAPSTAN FG AMP ADJUSTMENT (S5 : SERVO)

SPEC	FG DC BIAS = 6.0V ± 0.2V DC
TEST	P2210-14C[D5], P2210-16C[D5], TP14[F4], TP17[C4]
MODE	EE1 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE DC mode
INPUT	
ADJ.	VR1[I4], VR2[I4]

<STEP 1>

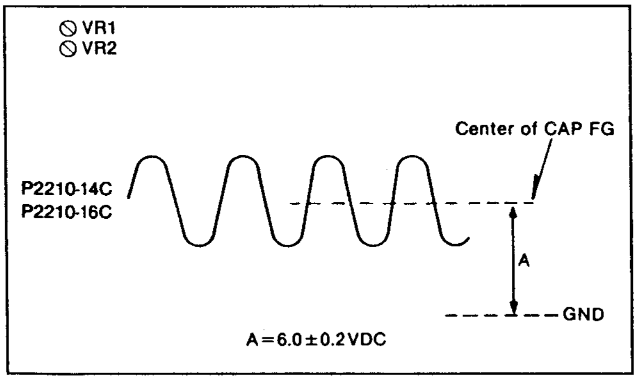
1. SCOPE : P2210-14C
2. Turn the capstan Motor by hand.
3. Adjust VR1 so that the center of CAP FG level A is 6.0V ± 0.2V DC as shown in Figure.

<STEP 2>

1. SCOPE : P2210-16C
2. Turn the capstan Motor by hand.
3. Adjust VR2 so that the center of CAP FG level A is 6.0V ± 0.2V DC as shown in Figure.

<STEP 3>

1. SCOPE CH1 : TP14
   CH2 : TP17
2. Turn the capstan Motor by hand.
3. Confirm that the pulse is appeard on the scope.



9-2. TAKE UP REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	T REEL TORQUE = 53gr.cm ± 5gr.cm
TEST	TAKE UP REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENTELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torquen Gauge and set the Dial Torque Gauge on the Gake Up Reel Motor.
4. Set the VTR into test mode.

   TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

   TEST → SERVO → REEL → F+F3

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

   SPECIFICATION = 5.gr.cm ± 5gr.cm

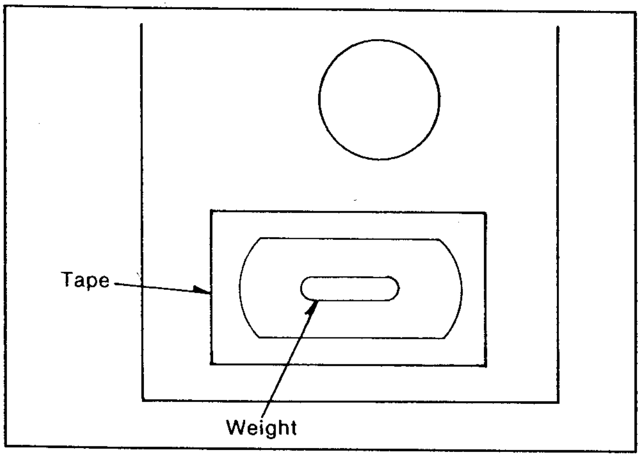
<STEP 2>

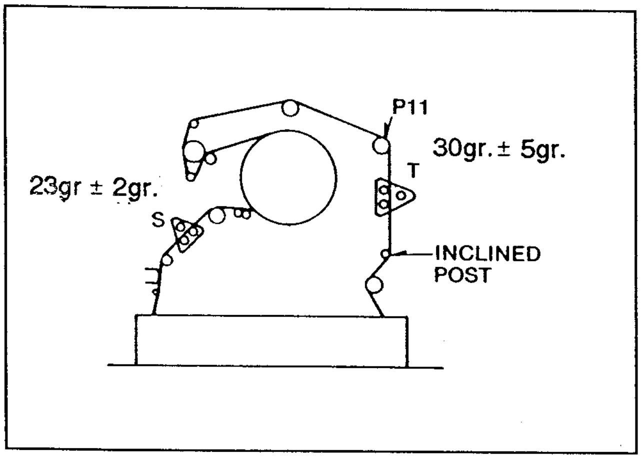
1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Take up Reel Torque so that the tension is within specification.

   SPECIFICATION : 30gr.cm ± 5gr.cm

SPEC	1	2	3	4	5	6
Factory Set	ON	ON	OFF	OFF	OFF	ON
Service Mode	ON	ON	OFF	ON	OFF	ON

Service Switch





9-3. SUPPLY REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	S REEL TORQUE = 45gr.cm ± 5gr.cm
TEST	SUPPLY REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENTELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque gauge, on the supply Reel Motor.
4. Set the VTR into Test mode.

   TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Supply Reel Torque adjustment mode as shown below.

   TEST → F8(SERVO) → F2(REEL) → F+F2(SREEL)

7. Adjust Front Panel adjustment VR so that the Supply Reel Torque is within specification.

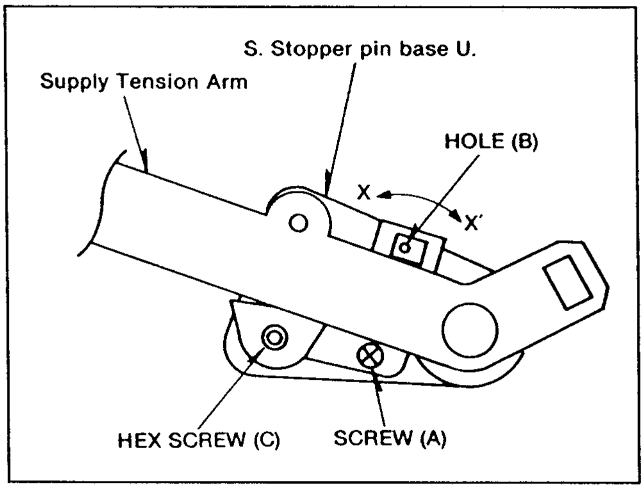
   SPECIFICATION = 45gr.cm ± 5gr.cm

<STEP 2>

1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Supply Reel Torque so that the tension is within specification.

   SPECIFICATION : 23gr.cm ± 2gr.cm (P2~P3)

4. If it is not within specification, loowen the screw (A).
5. Insert the Eccentric Screwdriver into Hole (B).
6. Adjust the position of S. Stopper Pin Base Unit so that the supply tension is 18gr.cm ~ 28gr.cm.
7. Insert the Hex Wrench to Hex Screw (C).
8. Adjust the position of S.Stopper Pin Base Unit so that the tension is 23 ± 2gr.
9. Tighten the screw (A), then reconfirm the tension after the screw (A) is tightened.



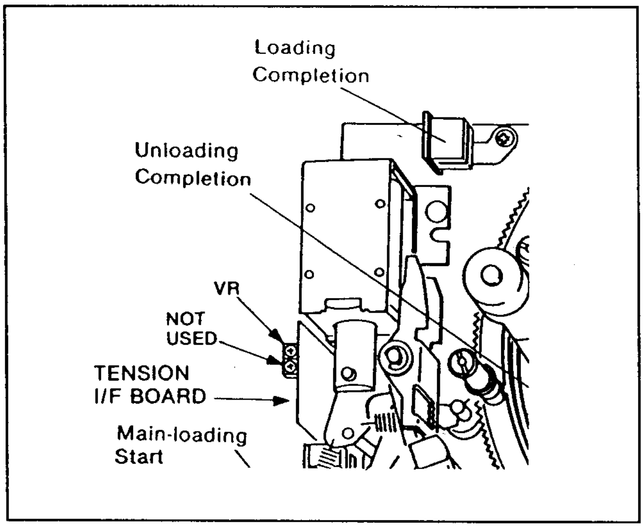
9-4. SENSOR AMP OFFSET ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = 2.5V ± 0.001V DC
TEST	TP2201[G4]
MODE	EJECT
TAPE	
M.EQ	DIGIRAL VOLT METER
INPUT	
ADJ.	VR (on the Tension I/F P.C.Board)

<STEP 1>

1. DIGITAL VOLT METER : TP2201
2. Adjustment VR on the Tension I/F P.C.Board so that the DC voltage is 2.5V ± 0.001V DC.

SPECIFICATION = 2.5V ± 0.001V DC



9-5. SUPPLY SENSOR VOLTAGE ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = 2.5V ± 0.02V
TEST	TP2201[G4]
MODE	EJECT → STOP → PLAY
TAPE	
M.EQ	DIGITAL VOLT METER, MECHANICAL NEUTRAL, ECCENTRIC SCREWDRIVER
INPUT	
ADJ.	SUPPLY MAGNET SENSOR BASE UNIT POSITION

<STEP 1>

1. Turns power off.
2. Remove the cassette compartment.
3. Turns power on.
4. Set the VTR into Mech Test modeas shown below.

TEST → MECH → NO TAPE → M CASSETTE

5. Remove the P3 Stopper from the Mech Neutral Plate and set the Mech Neutral Plate on the Reel Table.
6. Press STOP key to set the loading completion mode.

<STEP 2>

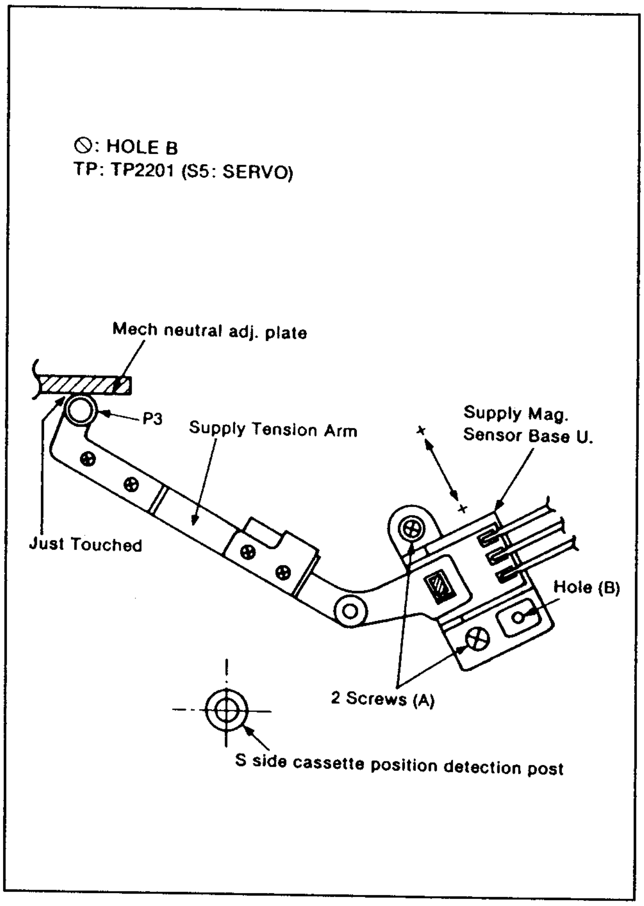
1. Make sure that the P3 post touches the arm of the Mechanical Neutral Plate as shown in Figure.
2. Confirm that the voltage at TP2201 is 2.5V ± 0.001V.
3. If it is not, loosen 2 screws (A) and insert the eccentric screw driver into hole (B).
4. Adjust the position of the Supply Magnet Sensor Base Unit until the voltage at TP2201 is in specification.

SPECIFICATION : 2.5V ± 0.015V

5. Tighten the 2 screws (A) and make sure the voltage at TP2201 does not change.
   (Make sure the voltage at TP2201 does not change.)

<STEP 3>

1. Place the unit in the PLAYBACK mode.
2. Confirm that the voltage at TP2201 (Vs) ± 0.002V.
3. If it is not, adjust the Supply Magnet sensor Base Unit, follow the procedure in <STEP 3>.



9-6. LOADING TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	LOADING TORQUE = 60gr.cm ± 2gr.cm
TEST	TAKE UP REEL
MODE	
TAPE	
M.EQ	REEL TORQUE METER
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque Gauge on the Take Up Reel Motor.
4. Set the VTR into Mechanism Test mode.

   TEST → SERVO → REEL → MEASURE → L

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

   TEST → F8 (SERVO) → F2 (REEL) → F + F1 (LOADING)

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

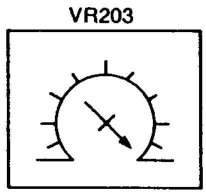
   SPECIFICATION = 60gr.cm ± 2gr.cm

9-7. CONFIRM THAT THE CAPSTAN ERROR MIX RATE VR (S5 : SERVO)

SPEC	
TEST	
MODE	
TAPE	
M.EQ	
INPUT	
ADJ.	VR203[G1], VR2011[ ]

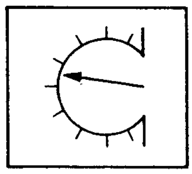
<STEP 1>

1. Turn VR203 to fully clockwise.



<STEP 2>

1. Set VR2011 to 5.5 division.



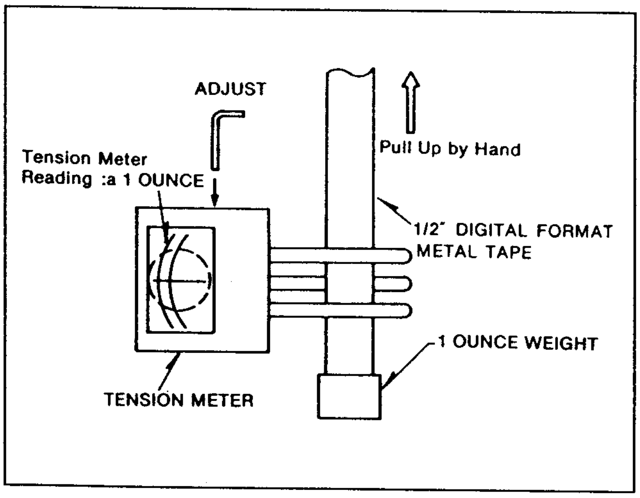
9-8. SUPPLY (FWD.) TENSION ADJUSTMENT (S5 : SERVO)

SPEC	TENSION = 23g ± 2g
TEST	"A" (P2 ~ P3), TP2201[G4]
MODE	PLAY → STOP
TAPE	BLANK 90min TAPE BEGINNING PORTION
M.EQ	TENSION METER, DIGITAL VOLT METER
INPUT	
ADJ.	SUPPLY STOPPER PIN BASE UNIT

<STEP 1>

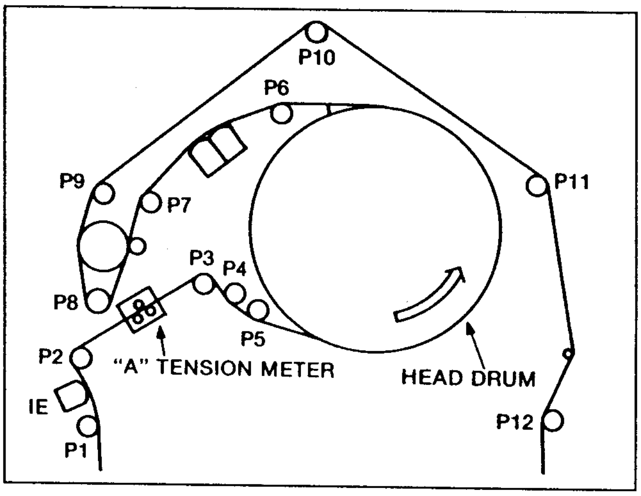
Calibration of Tension meter

1. Before performing of the tape tension adjustment. The Tension Meter should be checked as follows.
2. Use 1/2" Digital Metal tape and a 1 once weight.
3. Pull up a tape by hand as shown in Figure.
4. Adjust a Hex screw on the Tension Meter so that the tension meter reading is set for a 1 once.



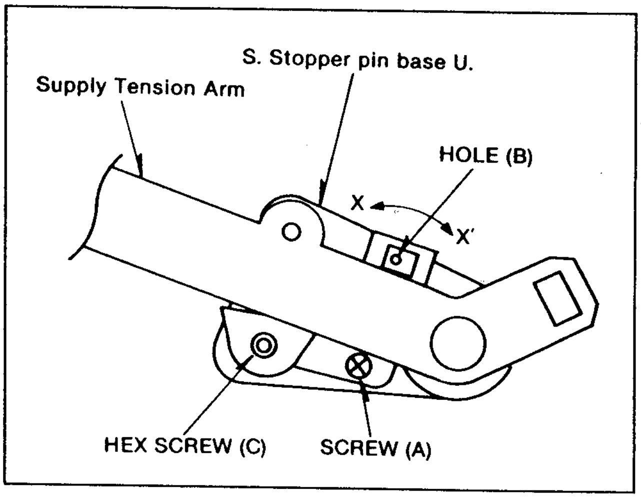
<STEP 2>

1. Insert the tension meter to between P2 and P3 post (portion "A") as shown in Figure.
2. Mode : PLAY, M cassette 90 min.
3. Confirm that the tape tension is 23 ± 2g at the tape beginning portion.



<STEP 3>

1. If it is not within specification, loosen the screw (A).
2. Insert the eccentric screwdriver into Hole (B).
3. Adjust the position of S.Stopper Pin Base Unit so that the supply tension is 18gr ~ 28gr.
4. Insert the Hex Wrench to Hex screw (C).
5. Adjust the position of S.Stopper Pin Base Unit so that the tension is 23 ± 2g.
6. Finally, tighten the screw (A).
7. Reconfirm the tension after the screw (A) is tightened.



<STEP 4>

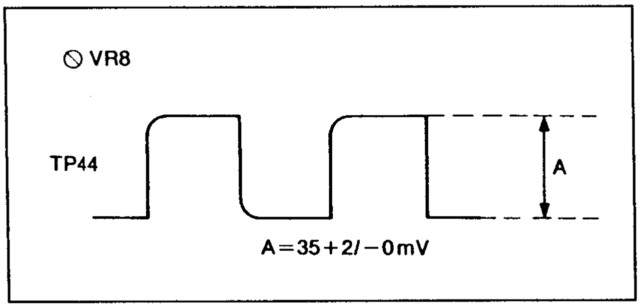
1. Place the unit in STOP mode.
   (Loading completed condition.)
2. SCOPE : TP2201
3. Confirm that the sensor voltage is (2.5V) ± 250mV.

9-9. CTL REC CURRENT ADJUSTMENT (S5 : SERVO)

SPEC	TP44 = 35mV + 2mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND = TPG5[G4]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8[G2]

<STEP 1>

1. SCOPE : TP44
2. Adjust VR8 so that the REC CTL pulse is 35 +2/-0 mV as shown in Figure.

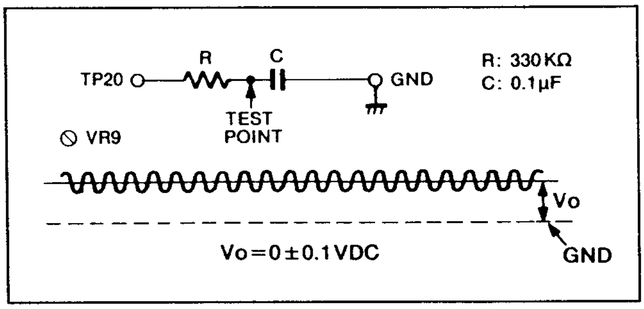


9-10. CONTROL PLAYBACK AMP OFFSET ADJUSTMENT (S5 : SERVO)

SPEC	TP20 + (CR) = 0V ± 0.1V DC
TEST	TP20[H1] ... REFER TO FIGURE
MODE	VAR 0.04
TAPE	NO SIGNAL RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR9[H2]

<STEP 1>

1. SCOPE : TP20
2. Adjust VR9 so that the DC level is 0 ± 0.1V DC.

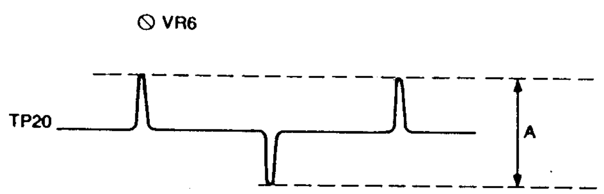


9-11. CTL PLAYBACK AMP GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR6[H1]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion.
4. Adjust VR6 so that the signal level A is 10 +2 Vp-p.
5. Confirm that the CF MODE and SERVO LED on the Front Panel turned on.



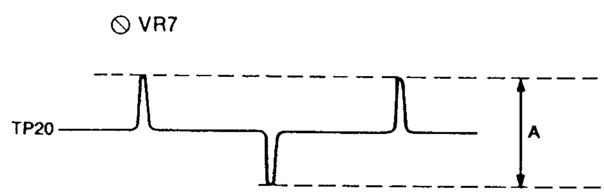
SPECIFICATION: A=10Vp-p+2V/−0V

9-12. CTL PLAYBACK AMP F/V GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → VAR SPEED : × 0.52
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR7[F3]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion by VAR × 0.52.
4. Adjust VR7 so that the signal level A is 10 +2 Vp-p.



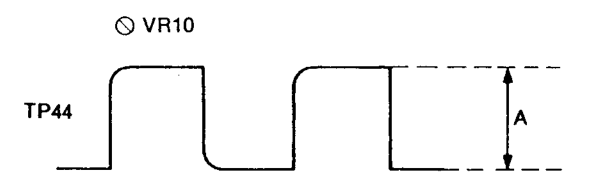
SPECIFICATION: A=10Vp-p+2V/−0V

9-13. CTL REC CURRENT ADJUSTMENT (S5 : SERVO)

SPEC	TP44 = 70mV +5mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND=TPG5[G3 or G4]
MODE	REC PLAY FAST FORMAT × 3 MODE
TAPE	SELF RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR to VIDEO IN
ADJ.	VR10[G1]

<STEP 1>

1. SCOPE : TP44
2. Place the unit in the Fast Format (X3) mode.
3. Adjust VR10 so that the signal level A is 70mV + 5mV/0mV.



SPECIFICATION: A=70mV+5mV/−0

Cf:
Fast Format (X3) mode
HOME
SET UP
FORMAT
EXECUTE

9-14. PG SHIFTER ADJUSTMENT (S5:SERVO)

SPEC	T = 27.0 ± 0.5μsec
TEST	TP11 (REC AMP) TP37 (SERVO)
MODE	PLAY
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	SW2[F2], SW3

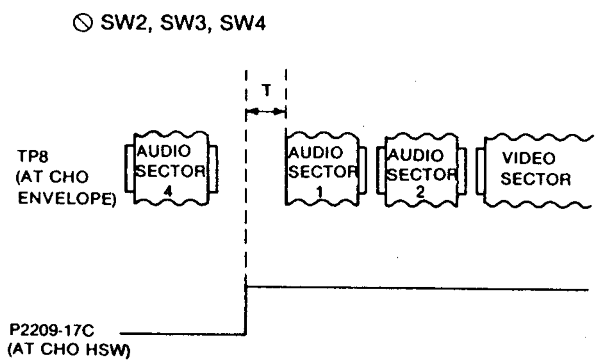
<STEP 1>
MENU CONDITION

TEST MENU

Select the TRACKING FIX/VAR F10 to "FIX".

<STEP 2>

1. SCOPE CH1 : TP11 (REC AMP)
   SCOPE CH2 : TP37 (SERVO)
2. SCOPE TRIGGER : CH2
3. Adjust SW2, 3 and 4 so that the period T is as shown in Figure.



SPECIFICATION: T=27.0±0.5μsec

SW2: Fine adjustment
SW3: Pre fine adjustment
SW4: Coarse adjustment

10. TIME CODE SECTION

10-1. SUPER C CURRENT ADJUSTMENT (S6 : TIME CODE)

TEST	VIDEO OUT 3, TV MONITOR
MODE	EE1, EJECT
TAPE	
M.EQ	TV MONITOR
INPUT	75% COLOR BAR
ADJ.	VR1[B1]

<STEP 1>

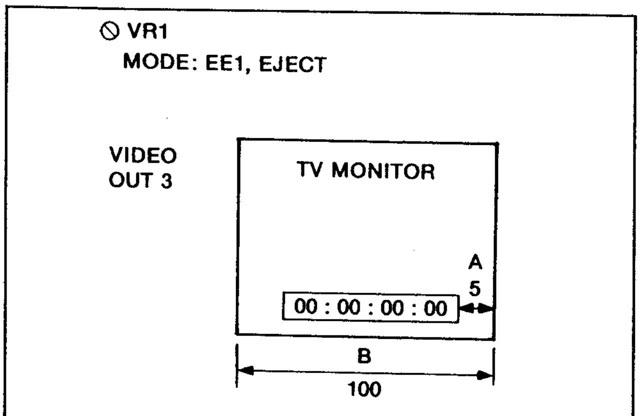
1. Set the VTR EE1 and EJECT mode.
2. Connect the TV monitor to VIDEO OUT 3.
3. Confirm the Time Code super is displayed o the monitor.

<STEP 2>

1. Set TC/CHR mode.
2. Set the POSITION (F1) from FIX to ARRANGE.
3. Press CURSOR RIGHT many times until the Time Code super reaches the right side of the TV monitor.

<STEP 3>

1. Adjust VR1 so that the Time Code super is displayed at right side of the monitor as shown in Figure.



SPECIFICATION: A : B=5 : 100

10-2. PB LTC LEVEL ADJUSTMENT (S6 TIME CODE SUB)

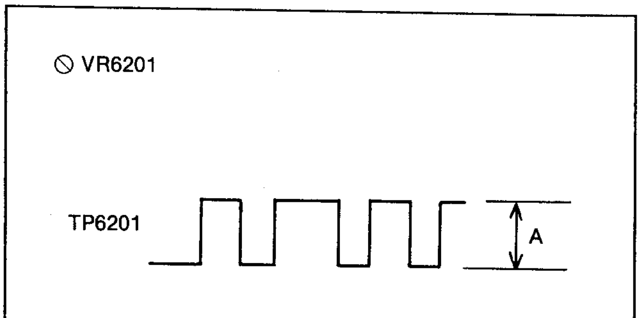
TEST	TP6201
MODE	PLAY
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	oscilloscope
INPUT	
ADJ.	VR6201

<STEP 1>

1. Place the VTR in the SHTL × 4mode.
2. Verify that the LTC level A as shown in figure.

<STEP 2>

1. Place the VTR in the normal play mode.
2. Adjust VR6201 so taht the LTC level is same as A level of SHTL × 4 mode.



SPECIFICATION A±0.3V

12. AUDIO PROCESS (S8) BOARD

12-1. DIGITAL AUDIO INTERFACE (1) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP401[H3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH1 (L) 1kHz -18dB, CH2 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR401[A2], VR403[A1]

4000 SERIES

<STEP 1>

1. SCOPE : TP401
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR401 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

12-2. DIGITAL AUDIO INTERFACE (2) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP402[I3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH3 (L) 1kHz -18dB, CH4 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR402[A3], VR404[A2]

<STEP 1>

1. SCOPE : TP402
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR402 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

12-3. CUE METER OFFSET ADJUSTMENT (S8 : AUDIO PROCESS)

SPEC	LESS THAN -50dB
TEST	CUE METER
MODE	STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR4551 [B4]

<STEP 1>

1. Set the VTR EE1 and STOP mode.
2. Adjust VR4551 so that the cue meter is less than -50dB.

13. VIDEO A/D PLL (S9) BOARD

Adjust with this section, perform after completed adjustment with L1 and L4 section.

MENU CONDITION

AUDIO IN MENU

Select the VIDEO INPUT F3 to "ANALOG"

VIDEO OUT SET UP MENU

Select the VIDEO STANBY OFF to "EE2"

STANBY OFF

VIDEO : TAPE, EE1, *EE2

MENU CONDITION

TEST MENU

VIDEO FUNCTION

Pless the SCH F10 Key on the Front Panel and display the INPUT REF SCH METER.

13-1. INPUT PLL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	MONITOR TV
MODE	EE2 (EJECT)
TAPE	
M.EQ	MONITOR TV
INPUT	ANALOG COLOR BAR to VIDEO IN
ADJ.	VR401 (PLL ADJ.)[G4]

8000 SERIES

<STEP >

1. Connect the MONITOR TV to VIDEO OUT 1.
2. Confirm that the E-E picture is synchronized on Monitor TV.
3. If hte E-E picture is not synchronized on Monitor TV, adjust VR401 follow the below adjustment procedure.

<STEP 2>

1. Turn VR401 fully clockwise and turn power OFF and ON.
2. Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
3. Memorized position of VR401 as shown in Figure (Position 1).

<STEP 3>

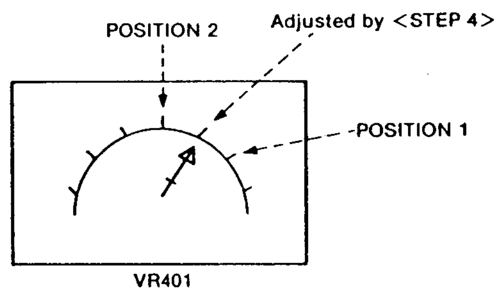
1. Turn VR401 fully clockwise and turn power OFF and ON.
2. Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
3. Memorized position of VR401 as shown in Figure (Position 2).

<STEP 4>

1. Set the VR401 in centered (position 1) and (position 2) sa shown in Figure.

MONITOR TV ⦸ VR401

FOR EXSAMPLE



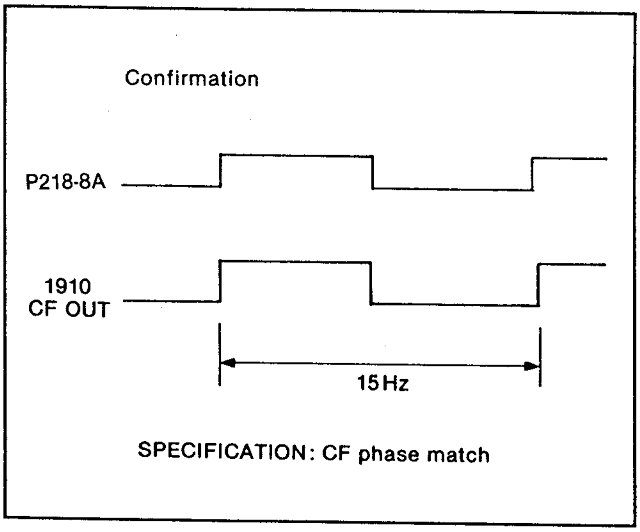
SPECIFICATION: CENTER OF POSITION 1 and 2

13-2. CF ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	AS SHOWN FIGURE
TEST	1910 CF OUT, P218 - 8A
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR TO VIDEO IN
ADJ.	VR602[H3]

<STEP 1>

1. SCOPE CH1 : 1910 CF OUT
   CH2 : P218 - 8A
2. Confirm that the CF output of signal generator is same phase as P218 - 8A signal.
3. If not, readjust VR602.



13-3. SCH ADJUSTMENT (S9 : VIDEO A/D PLL)

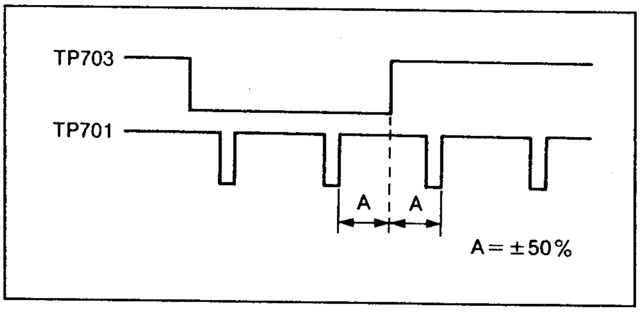
SPEC	AS SHOWN FIGURE
TEST	TP701[G2], TP703[G1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR SIGNAL TO REF INPUT AND VIDEO IN
ADJ.	VR701[G1]

<STEP 1>

1. SCOPE CH1 : TP703 (TRIGGER)
   CH2 : TP701
2. Set the SW701 to ON.

<STEP 2>

1. Turn VR701 to clockwise.
2. Adjust VR701 so that the waveform phase is as shown in figure.

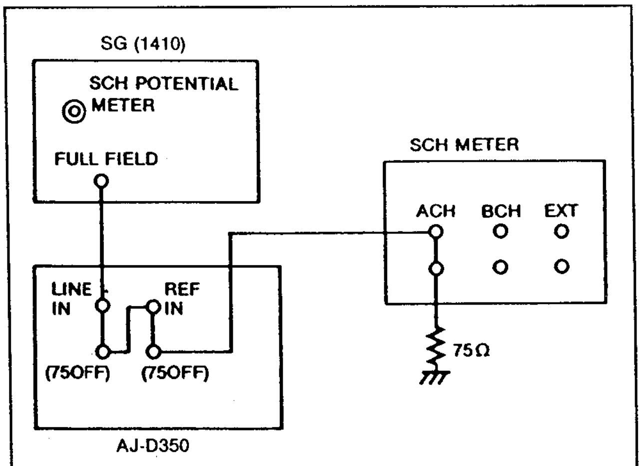


13-4. INCOME CF DETECTION ADJUSTMENT (1) (S9 : VIDEO A/D PLL)

SPEC	ALTERNATE +90° and -90°
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1410 75% COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2) [G1], VR705 (SCH GAIN) [I2], VR706 (SCH OFFSET) [I2]

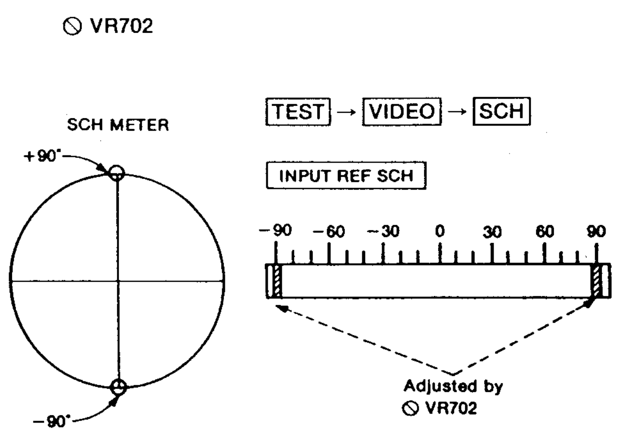
<STEP 1>

1. CONNECTION
2. CONFIRMATION
   Confirmation that the SCH phase on SCH METER.



<STEP 2>

1. Set VR705 and VR706 to center position.
2. Adjust the Potential Meter on 1410 so that the SCH is -90° by turns.
3. Turn VR702 to fully clockwise.
4. Display the INPUT REF SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
5. Adjust VR702 so that the INPUT REF SCH METER displayed +90° and -90° by turns.
6. After finished this adjustment, perform 13-5 SCH METER ADJUSTMENT.



SPECIFICATION: ALTERNATE +90° and -90°

13-5. SCH METER ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1410 75% COLOR BAR to VIDEO IN
ADJ.	VR705 (SCH GAIN)[I2], VR706 (SCH OFFSET)[I2]

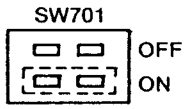
<STEP 1>

MACHINE CONDITION

Refer to <STEP 1> on item 13-2.

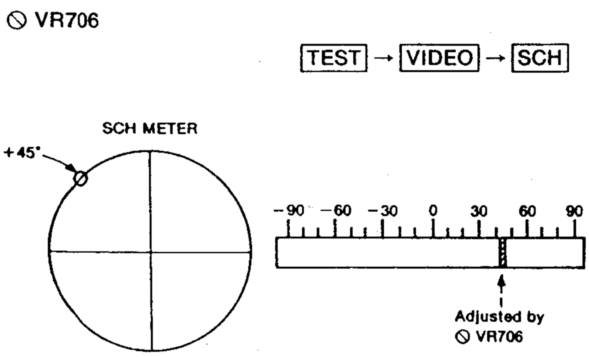
<STEP 2>

1. Confirm that the SCH of SW701 is set to ON position.



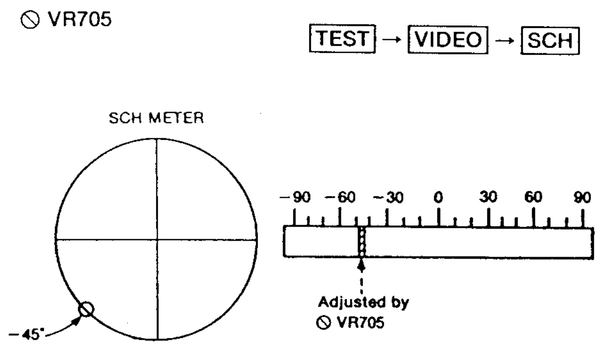
<STEP 3>

1. Set the SW701 to ON side as shown in Figure.
2. Adjust the Potention Meter VR on 1410 so that the SCH is +45° at SCH METER.
3. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
4. Adjust VR706 so that the INPUT SCH METER displayed +45°.



<STEP 4>

1. Adjust the Potention Meter VR on 1410 so that the SCH is +45° at SCH METER.
2. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
3. Adjust VR705 so that the INPUT SCH METER displayed -45°.



<STEP 5>

1. Re-adjust above <STEP 3> and <STEP 4> until stabilize the SCH indication.

13-6. INPUT SCH DETECTION ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	Voltage at TP707, TP708 = TP706 ± 20mV
TEST	TP706[I1], TP707[I1], TP708[I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	1410 75% COLOR BAR to VIDEO IN
ADJ.	VR703 (SCH - H)[I2], VR704 (SCH - L)[I2]

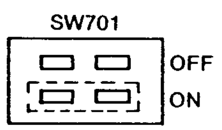
<STEP 1>

MACHINE CONDITION

Refer to <STEP 1> on item 13-2.

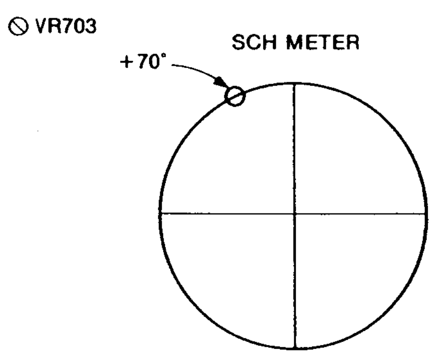
<STEP 2>

1. Confirm that the SCH of SW701 is set to ON position.



<STEP 3>

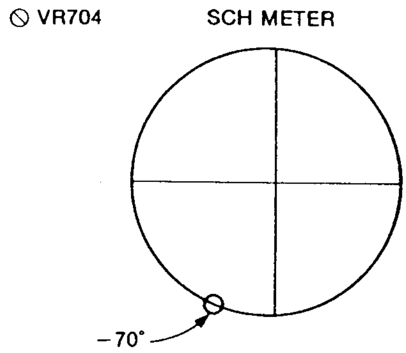
1. SCH METER : SCH mode
2. Adjust the Potention Meter VR on 1410 so that the SCH is +70° at SCH METER.
3. SCOPE CH1 : TP707
   CH2 : TP706
4. Measure the voltage at TP706.
5. Adjust VR703 so that the DC voltage at TP707 is TP706 ± 20mV.



SPECIFICATION = Voltage at TP706 ± 20mV

<STEP 4>

1. Adjust the Potention Meter VR on 1410 so that the SCH is -70° at SCH METER.
2. SCOPE CH1 : TP708
   CH2 : TP706
3. Adjust VR703 so that the DC voltage at TP708 is TP706 ± 20mV.



SPECIFICATION = Voltage at TP706 ± 20mV

13-7. INCOME CF DETECTION ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	FRONT SCH METER DISPLAY 0°
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2)[G1]

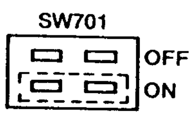
<STEP 1>

MACHINE CONDITION

Refer to <STEP 1> on item 13-2.

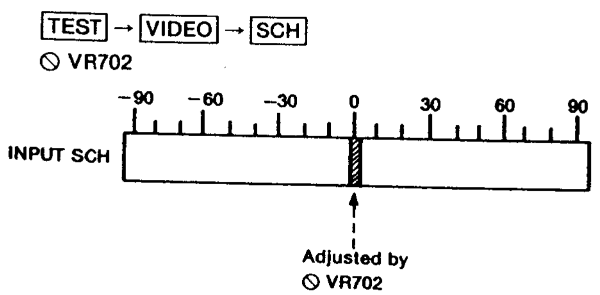
<STEP 2>

1. Confirm that the SCH of SW701 is set to ON position.



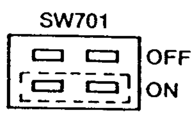
<STEP 3>

1. Turn the power OFF and ON.
2. Display the OUT REF SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
3. Adjust VR702 so that the OUT REF SCH METER displays 0°.



<STEP 4>

1. Confirm that the SW701 is set to ON position.

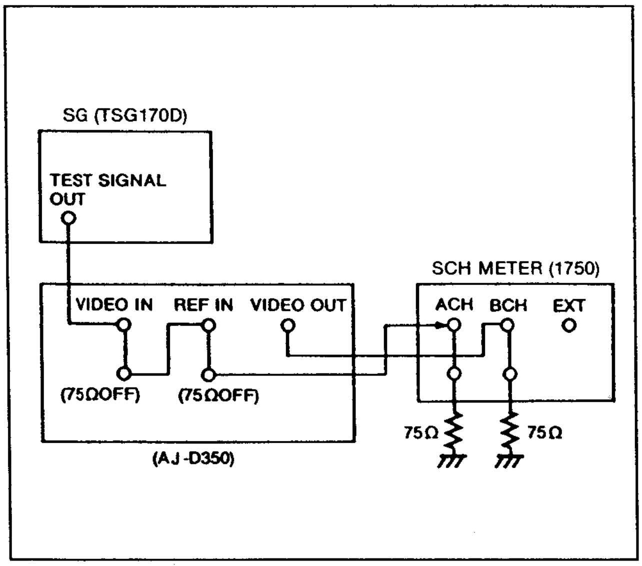


13-8. VIDEO PHASE ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	VIDEO OUT IC611-Pin 2, TP401[G2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR601 (H PHASE)[G2]

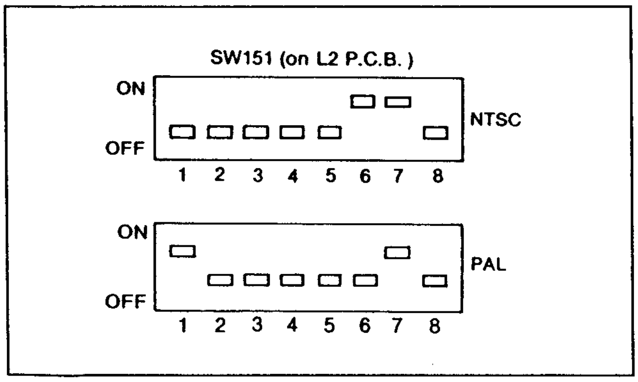
<STEP 1>

1. Connect the VTR as follows.



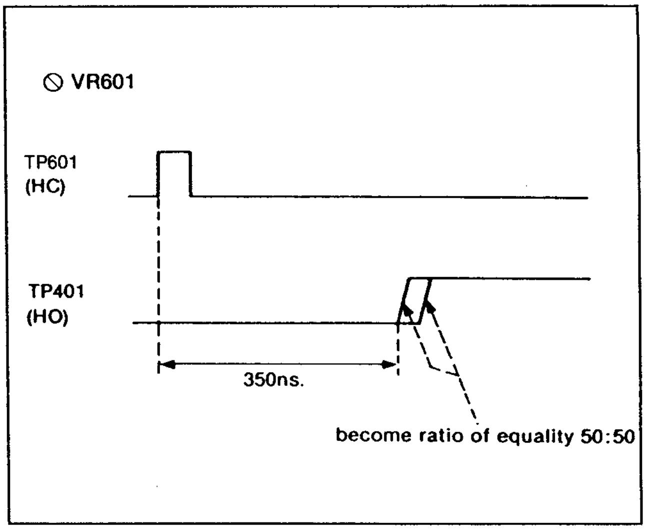
<STEP 2>

1. Set the Dip SW 151 on the L2 P.C.B. as follow as shown in Figure.



<STEP 3>

1. SCOPE CH1 : TP601
   CH2 : TP401
2. Adjust VR601 so that the relation between HC and HO signal as shown in Figure.

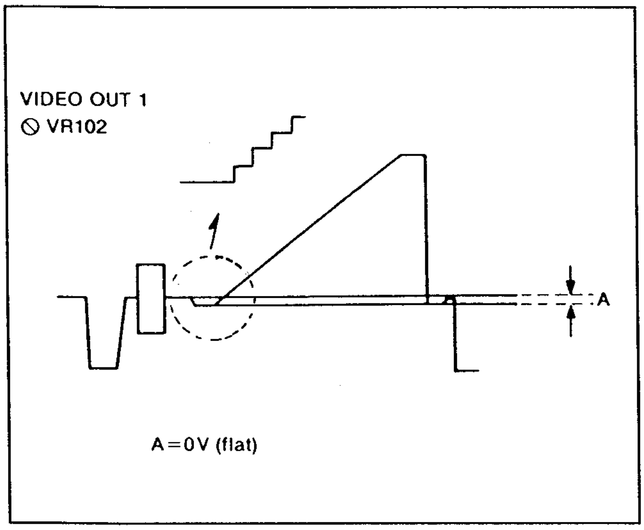


13-9. VIDEO INPUT CLAMP ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	A = 0V (FLAT)
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL RAMP SIGNAL to VIDEO IN
ADJ.	VR102 (CLAMP DC)[B3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR102 so that the A portion is flat as shown in Figure.



<STEP 2>

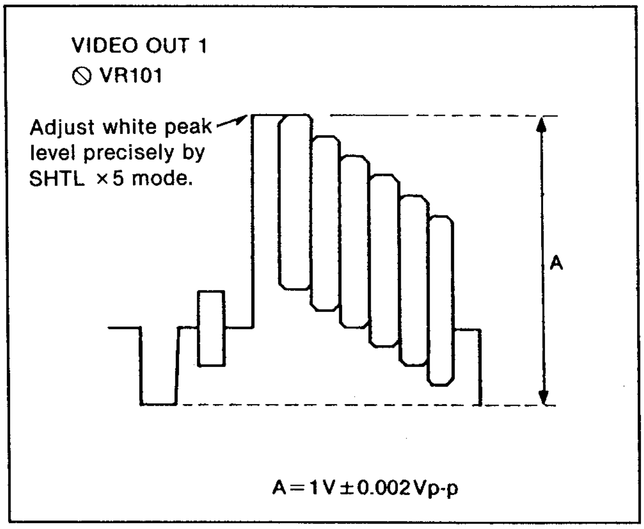
1. Expand WFM monitor by × 5 mode.
2. Confirm that there are 3 stairs in the 5 divisions of WFM monitor as shown in figure.

13-10. VIDEO INPUT LEVEL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	VIDEO OUT 1 = 1V ± 0.002Vpp
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR101 (A/D LEVEL [A3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR101 so that the Video Level (A) is 1 ± 0.002V as shown in Figure.

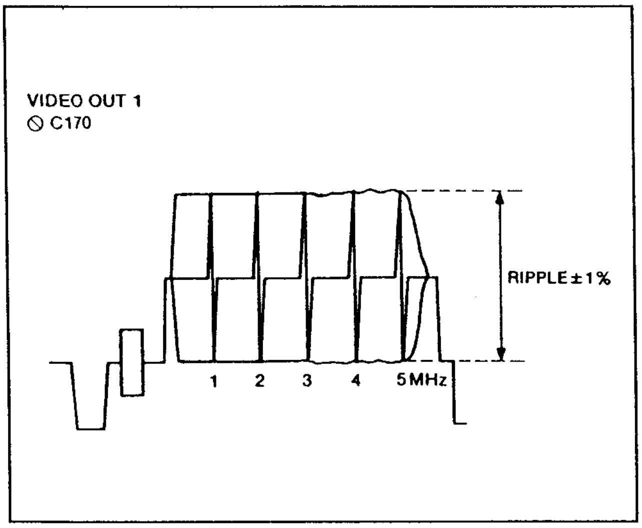


13-11. VIDEO INPUT FREQUENCY ADJUSTMENT (1) (S9 : VIDEO A/D PLL)

SPEC	RIPPLE ± 1%
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL H SWEEP to VIDEO IN
ADJ.	C170[A2]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust C170 so that level from 1MHz to 4MHz is flat as shown in Figure.

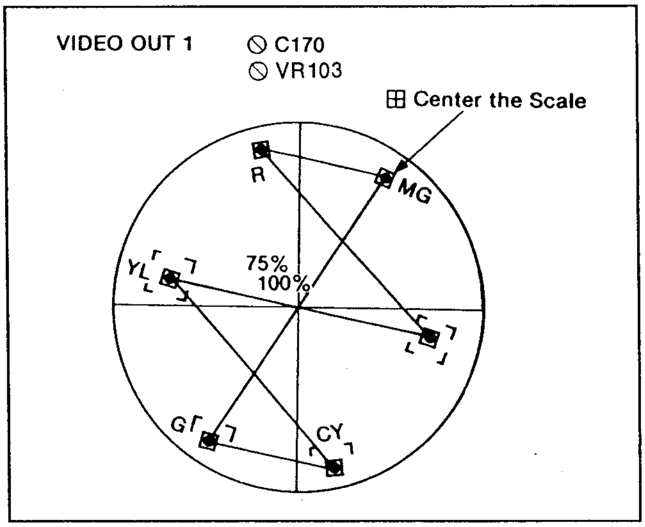


13-12. VIDEO INPUT FREQUENCY ADJUSTMENT (2) (S9 : VIDEO A/D PLL)

SPEC	CENTER OF THE SCALE
TEST	VIDEO OUT 1
MODE	E-E (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	C170[A2], VR103[B3]

<STEP 1>

1. WFM MONITOR:VIDEO OUT 1
2. Adjust C170 so that each vector level is in center the scale of vector scope.
3. Adjust VR103 so that the each vector dot is in center of the box.



13-13. INPUT LEVEL METER ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	INPUT LEVEL METER = 0dB
TEST	INPUT LEVEL METER
MODE	E-E (EJECT)
TAPE	
M.EQ	
INPUT	(TSG273) 100% COLOR BAR to VIDEO IN
ADJ.	VR201 (BOT DC ADJ.)[D2], VR202 (AD VRT ADJ.)[D3]

<STEP 1>

MENU CONDITION

VIDEO IN MENU : F5
Select the LEVEL DET to "PEAK".

<STEP 2>

1. Adjust VR202 so that the VIDEO INPUT LEVEL METER is 0dB.

<STEP 3>

MENU CONDITION

VIDEO IN MENU : F5
Select the LEVEL DET to "SYNC".

<STEP 4>

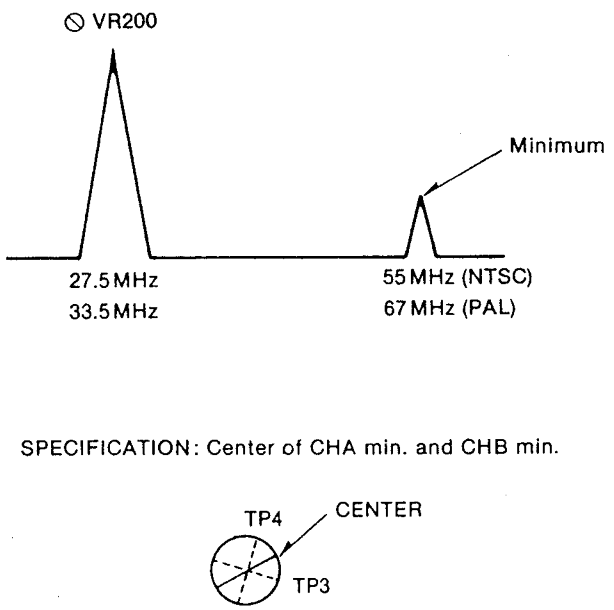
1. Adjust VR201 so that the VIDEO INPUT LEVEL METER is 0dB.

14. REC AMP BOARD

Confirm that the Machine Condition with L2, L3, L4, S1 and S2 board, refer to Machine Condition at the beginning of SECTION 5 (REC/PLAY CH0/CH1)

14-1-(1). REC 2nd HARMONICS DISTORTION ADJUSTMENT (1) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP3 (CH0 A0)[B2], TP4 (CH0 B)[B2]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR200[B6]



SPECIFICATION: Center of CHA min. and CHB min.

<STEP 1>
Set the spectrum analyzer as follows.

(REG 3)

REFERENCE LEVEL	:	0dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	10dB/div
START FREQUENCY	:	20MHz
STOP FREQUENCY	:	70MHz
RES BW	:	300kHz
VIDEO BW	:	10kHz
SWEEP TIME	:	30m sec
TRIGGER	:	FREE RUN

<STEP 2>
1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.

TEST → RF → BS + F8 →
(CURSOR CENTER) → ↓ ↓
→ →

3. Connect the spectrum analyzer probe to TP3.
4. SP USER MENU
   Set the item "HEAD" to A from NOR
5. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
6. Connect the spectrum analyzer probe to TP4.
7. SP USER MENU

   Set the item "HEAD" to B from A

8. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
9. Set the VR200 at certer between item 5 and 8.
10. Press HOME key.

14-1-(2). REC 2nd HARMONICS DISTORTION ADJUSTMENT (2) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP7 (CH1 A)[B1], TP8 (CH1 B)[B1]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR201[B6]

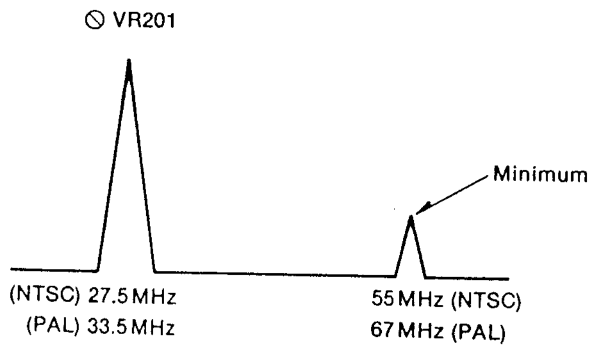
<STEP 1>

Set the spectrum analyzer as follows.
(REG 3)

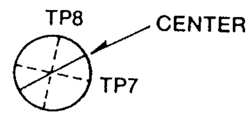
REFERENCE LEVEL	:	0dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	10dB/div
START FREQUENCY	:	20MHz
STOP FREQUENCY	:	70MHz
RES BW	:	300kHz
VIDEO BW	:	10kHz
SWEEP TIME	:	30m sec
TRIGGER	:	FREE RUM

<STEP 2>

1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.
TEST → RF → BS + F8 →
(CURSOR CENTER) → ↓ ↓
→ →
3. Connect the spectrum analyzer probe to TP7.
4. SP USER MENU
Set the item "HEAD" to A from NOR
5. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
6. Connect the spectrum analyzer probe to TP8.
7. SP USER MENU
Set the item "HEAD" to B from A
8. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
9. Set the VR201 at certer between item 5 and 8.
10. Press HOME key.



SPECIFICATION: Center of CHA min. and CHB min.



14-2. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH0) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 BOARD), TP207 (REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (S MENU) VR2 (CH0 A FREQ), VR4 (CH0 B FREQ)

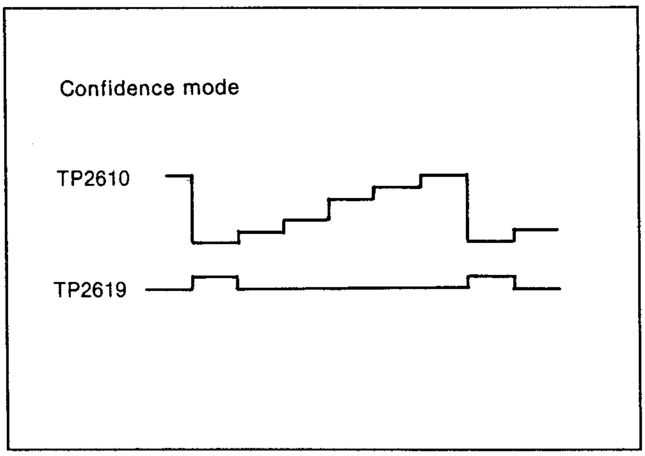
<STEP 1>
Set the spectrum analyzer as follows.
(REG 4)

REFERENCE LEVEL	:	-10.0dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	5dB/div
START FREQUENCY	:	0Hz
STOP FREQUENCY	:	50MHz
RES BW	:	1MHz
VIDEO BW	:	3kHz
SWEEP TIME	:	300m sec
TRIGGER	:	EXT(HEAD SW)

<STEP 2>
Set the VTR shuffling off, error correction off and error concealment off mode.
L2 SW51-2 (OFF), SW51-3 (OFF)
L3 SW1 (OFF), SW2 (OFF), SW3 (OFF), SW4 (OFF)
L4 SW802 (OFF)

<STEP 3>
1. Connect the spectrum analyzer probe to TP8 on S1 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

<STEP 4>
1. SCOPE CH1 : TP2610 (S4)
   SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.
   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) → TAPE → MANUAL EDIT → INSERT
3. Set the VTR PLAY mode.
4. Confirm that the waveform is shown below and the envelope level on the front panel bar graph becomes maximum.
   If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.
   TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT
   → RF → AT HEIGHT (F7) → BS+F8 → [ ](CURSOR CENTER) → F+[←]
   A and B Heads are selected by cusor key [←] [→].

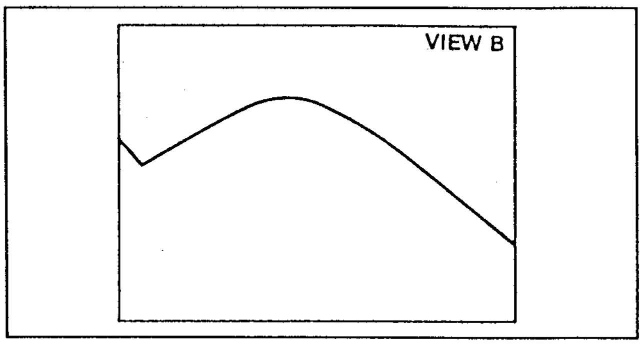


Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>
1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.

   MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 place the AT Heads in the confidence position, when in Playback mode.
The frequency characteristics can then be memorized and compared to the Rec frequency characteristics.



<STEP 6>

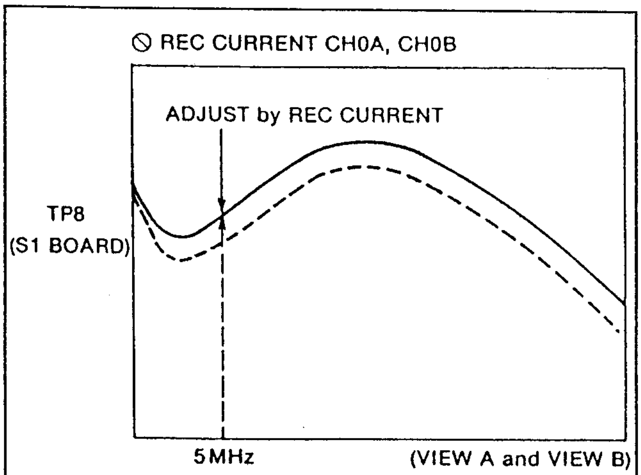
1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S1 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position to get maximum envelope on CH0 display.
5. Set the FRONT MENU to <u>REC CURRENT mode.</u>

   TEST → RF → F4(REC CURRENT) → BS+F8 → [ ] (CURSOR CENTER) → F+[←]
   CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by cursor key [↑] [↓].

6. Confirm that envelope on the bar graph is still keeping maximum level. If not, back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spactrum analyzer to REG 5. (refer to set up chart).

<STEP 7>

Adjust the REC Current CH0 A and CH0 B so that the waveform level is same level with the alignment tape play level at 5MHz.



— ALIGNMENT TAPE
······ CONFIDENCE PLAYBACK (REC)

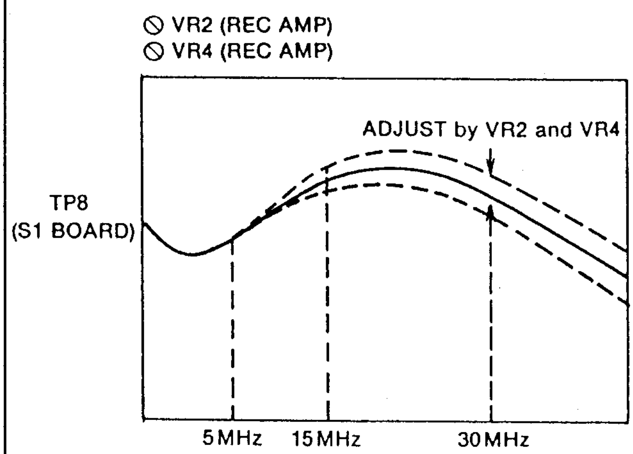
SPECIFICATION: SAME LEVEL ±0.5dB

<STEP 8>

1. CH0B Rec Current Adjustment is same as CH0A which is described STEP 6- ~ STEP 7. (Just change the CH).

<STEP 9>

1. Adjust VR2 (CH0 A) and VR4 (CH0 B) so that the waveform level is same at 30MHZ as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH0 B to -128 by using adjustment VR on the front panel. And adjust VR2 (CH0 A) so that the error rate is minimum and same level.
3. Adjust VR4 (CH0 B) so that the error rate is minimum by using the same method above.

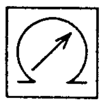


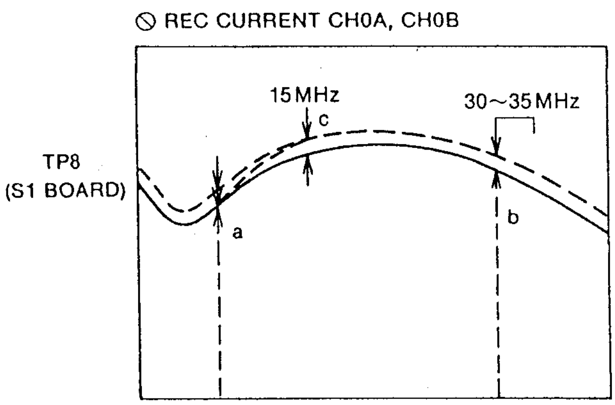
SPECIFICATION: SAME LEVEL 0dB~ −2dB

<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjustment point of VR2 and VR4 are as shown below.





SPECIFICATION: 1) b>O A=O
2) c>O A=C
O=PB level

<STEP 11>

1. Set the machine condition as follows.

   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) → TAPE → MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

14-3. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH1) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8(S2 BOARD), TP207(S2 BOARD) → EXT IN
MODE	VAR × 1
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR7 (CH1 A FREQ), VR9 (CH1 B FREQ)

<STEP 1>

Set the spectrum analyzer as follows.
(REG 4)

REFERENCE LEVEL	:	-10dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	5dB/div
START FREQUENCY	:	0Hz
STOP FREQUENCY	:	50MHz
RES BW	:	1MHz
VIDEO BW	:	3kHz
SWEEP TIME	:	300m sec
TRIGGER	:	EXT (HEAD SW)

<STEP 2>

Set the VTR shuffling off, error correction off and error concealment off mode.

L2 SW51-2 (OFF), SW51-3 (OFF)
L3 SW1 (OFF), SW2 (OFF), SW3 (OFF), SW4 (OFF)
L4 SW802 (OFF)

<STEP 3>

1. Connect the spectrum analyzer probe to TP8 on S2 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

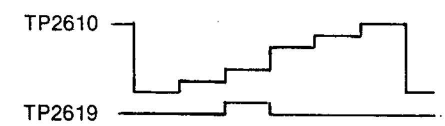
<STEP 4>

1. SCOPE CH1 : TP2610 (S4)
   SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.

   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) →
   TAPE → MANUAL EDIT → INSERT

3. Set the VTR PLAY mode.
4. Confirm that the waveform is shown below and the envelope level on the front panel bar graph becomes maximum.
   If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.

   TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT → RF → AT HEIGHT → BS+F8 → [ ](CURSOR CENTER) → F+[←]
   A and B Heads are selected by cusor key [←] [→].



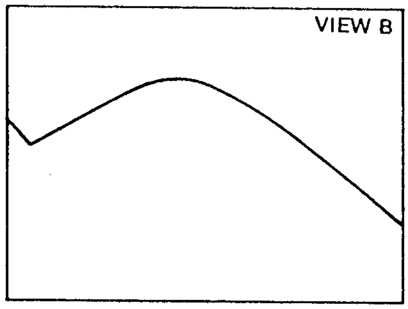
SPECIFICATION: TP2619 pulse is located at the third step of TP2610

Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>

1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.
   MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 is place the AT Heads in the confidence position, when in Playback mode.
The frequency characteristics can be memorized and compared to the Rec frequency characteristics.



<STEP 6>

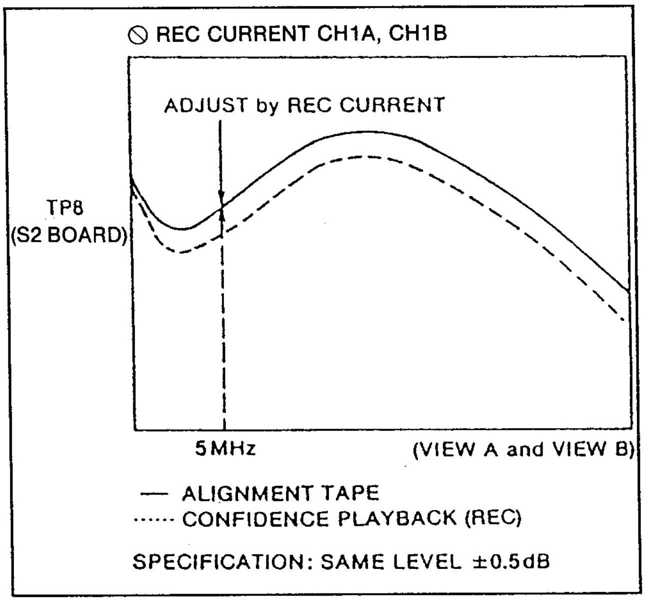
1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S2 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position. to get maximum envelope on CH1 display.
5. Set the FRONT MENU to REC CURRENT mode.

   TEST → RF → F4(REC CURRENT) → BS+F8 → [ ] (CURSOR CENTER) → F+[←]
   CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by cursor key [↑] [↓].

6. Confirm that envelope on the bar graph is still keeping maximum level. If not back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spectrum anallyzer to REG 5. (refer to set up chart).

<STEP 7>

Adjust the REC Current CH1 A and CH1 B so that the waveform level is same level with the alignment tape play level at 5MHz.

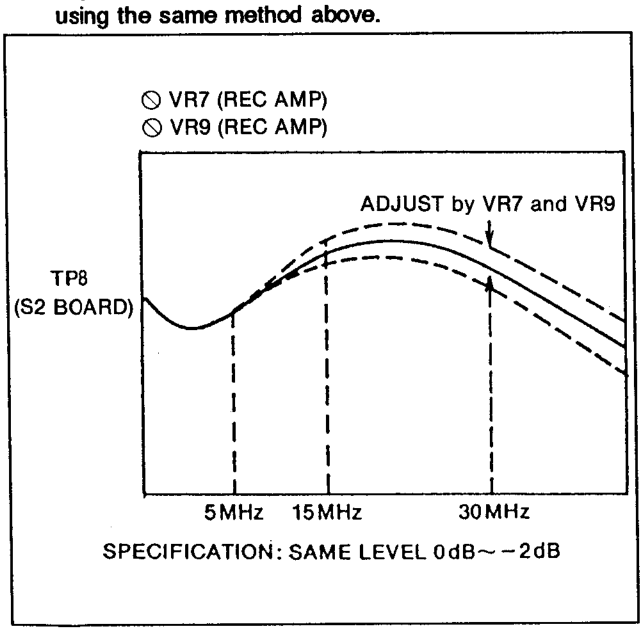


<STEP 8>

1. CH1B Rec Current Adjustment is same as CH1A which is described STEP 6-3 ~ STEP 7 (Just change the CH).

<STEP 9>

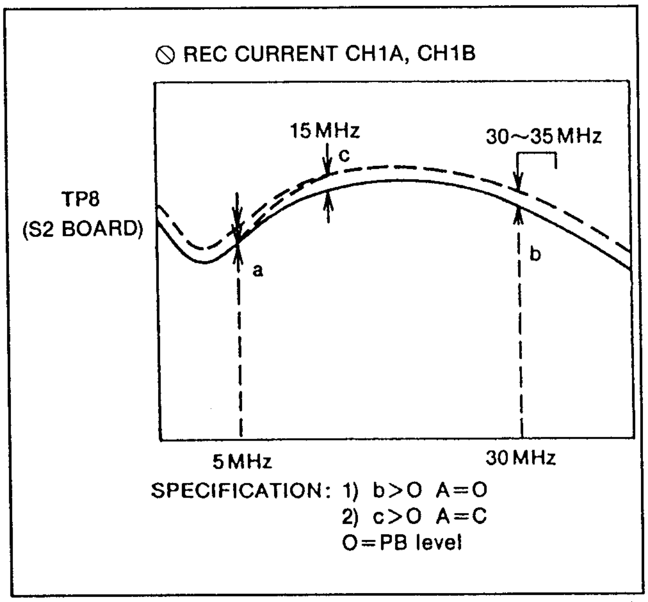
1. Adjust VR7 (CH1 A) and VR9 (CH1 B) so that the waveform level is same at 30MHZ as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH1 B to -128 by using adjustment VR on the front panel. And adjust VR7 (CH1 A) so that the error rate is minimum and same level.
3. Adjust VR9 (CH1 B) so that the error rate is minimum by using the same method above.



<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjust point of VR7 and VR9 are as shown below. 



<STEP 11>

1. Set the machine condition as follows.

   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) → TAPE → MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

<STEP 13>

1. Save the REC CURRENT DATA as follows TEST MENU.
   BS + F8 → F9 (Select USER) → F + F11 (SAVE)

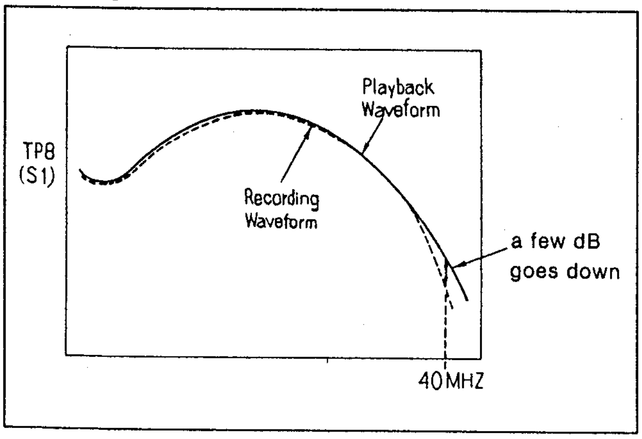
Note: When save the data, REC CURRENT data display will be disappeared.

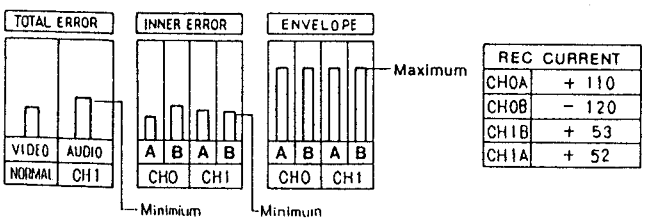
ADJUSTMENT KNOW HOW (INFORMATION)

1. Insert a cassette and place the unit in recording mode.
2. Set the machine condition as follows.
   TEST → RF → REC CURR → [ ] (CURSOR CENTER)→ [→] → (REC CURR).
   CH0 A, CH0 B CH1 A or CH1 B Heads are selected by cursor key [↑] [↓].
3. Adjust each CH by using the adjustment VR on the front panel so that the output envelope is maximum and minimum error on the display.

* In confidence mode, if adjust CH0 A, change the CH0 B envelope output. (CHA recording, CHB playback in confidence mode).

4. Adjust VR2, VR4, VR7 and VR9 on the REC AMP board so that the error rate is minimum.
5. After this adjustment check the frequency characteristics waveforms by using the spectrum analyzer. Refer to the item 14-2 and 14-3.
6. This specification is minimum error rate. (Inner Error rate is less than 4 on the display bar.)
7. If out of specification check the frequency characteristic waveform by using the spectrum analyzer. Connect the spectrum analyzer to TP8 on the S1 board and play back the alignment tape (1) and memorize the frequency characteristic waveform.
8. After memorize, place the unit in the recording mode.
9. If output waveform is same as the playback waveform, readjust the VR612 and VR613 so that the output level goes down a few dB level around 40MHz portion and minimum error rate as shown in Figure.





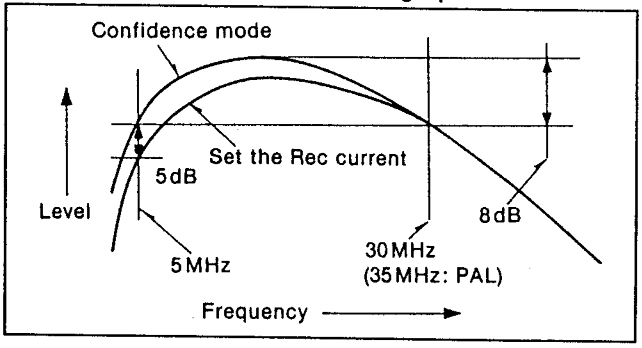
FINAL CONFIRMATION

SPEC	REFER TO FIGURE
TEST	TP8(S1,S2 BOARD), TP207(REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	75% COLOR BAR SHUFFLING OFF ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR2, VR4, VR7, VR9

1. Set the spectrum analyzer as shown item 14-2.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP207.
4. Place the unit in the recording mode and memories the frequency characteristics waveform to VIEW B of the spectrum analyzer.
5. Set the Rec current of front panel so that the output spectrum of 5MHz goes down to -5dB.
6. Confirm that the output spectrum as shown in figure.
7. If it is not, readjust the Rec current of front panel and VR2, VR4, VR7 and VR9.

MIX point of Both Spectrum = 30MHz ± 3MHz

8. Confirm that the error rate is minimum and envelope is maximum at bar graph.

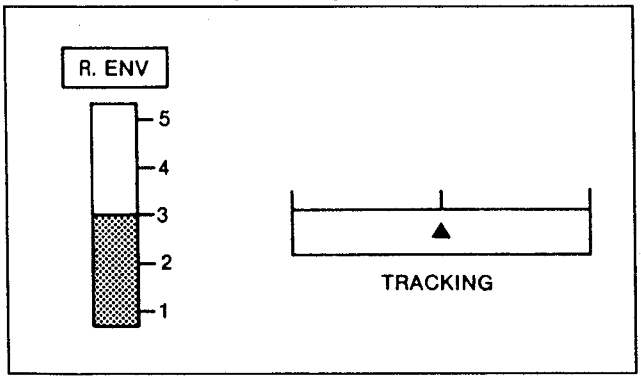


14-4. RF2 ENVELOPE DETECTION ADJUSTMENT

SPEC	MAX. ENVELOPE ON FRONT METER
TEST	FRONT METER OF TEST RF MENU
MODE	PLAY
TAPE	COLOR BAR SECTION OF ALIGNMENT TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	
ADJ.	VR10[B3](CH1 OFF), VR12[B3](CH1 GAIN) VR5 [F1], VR11 [G1]

<STEP 1>
1. Set VR11 to center position.
2. SCOPE CH1 : TP1
   CH2 : TP207 for Trigger
3. Adjust VR5 so that the DC voltage is 1.5V ± 0.1V.

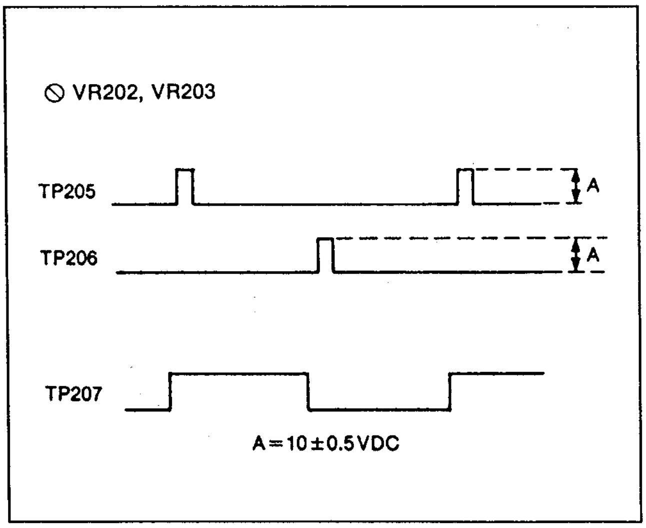
<STEP 2>
1. Turn the VR10 fully colockwise.
2. Playback the alignment tape color bar portion.
3. Set the tracking FIX mode.
   TEST → RF → TRACKING → FIX
4. Adjust VR12 so that the envelope meter shows 3.0 as shown in figure.
5. Set the tracking variable mode.
   TEST → RF → TRACKING → VAR
   Confirm the envelope meter value is changed when the front panel adjustment VR is turned.



14-5. ROTARY ERASE ADJUSTMENT (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 and S2)[E2], TP205[J5], TP206[K5],
MODE	AUDIO INSERT → VAR X 1
TAPE	BLANK TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR202[O3], VR203[N1]

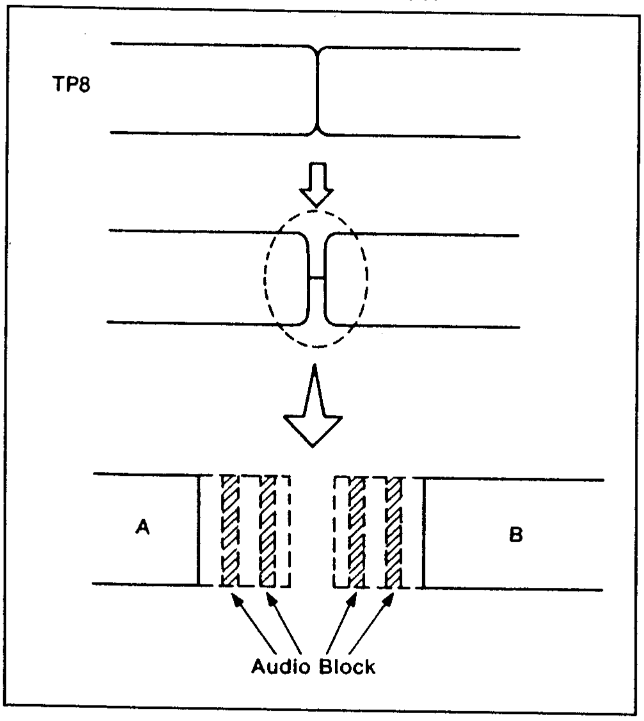
<STEP 1>
1. SCOPE CH2 : TP205
   CH3 : TP206
   CH4 : TP207
2. SCOPE TRIGGER : CH4
3. Disconnect the P504 and P511.
4. Set the "AUDIO INSERT" mode on MENU condition.
5. Place the unit in the Audio Insert mode. (PLAY → REC)
6. Adjust VR202 so that the DC voltage is 10 ± 0.5V DC as shown in Figure.
7. Adjust VR203 so that the DC voltage is 10 ± 0.5V DC as shown in Figure.



<STEP 2>
1. SCOPE CH1 : TP8/TPG5 (S1 board)
   CH4 : TP207
2. Playback an after adjustment recorded portion on VAR X 1 mode.
3. Confirm that the Audio Block of envelope is erased as shown in Figure.

<STEP 3>

1. SCOPE CH1 : TP8/TPG5 (S2 board)
   CH4 : TP207
2. Confirm that the envelope is within the above specification.
3. Re-connect the P504 and P511.



15. HEAD AMP REGULATOR BOARD

15-1. DC OUTPUT ADJUSTMENT (H.A REGURATOR)

SPEC	SV DC ± 0.1V DC
TEST	TP5
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR2

<STEP 1>

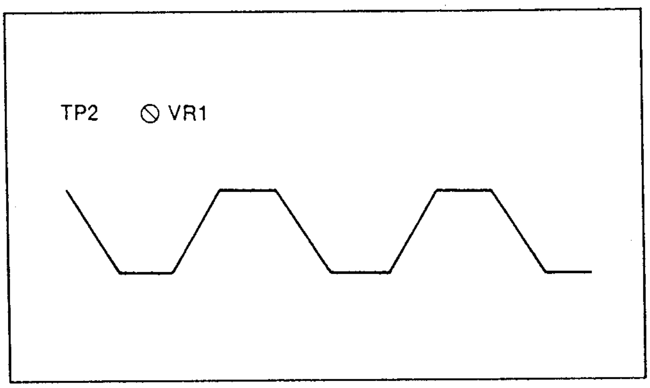
1. OSCILLOSCOPE : TP5
2. Adjust VR2 so that the adjust DC is 8V DC ± 0.1V DC.

15-2. WAVEFORM SHADER ADJUSTMENT (H.A REGURATOR)

SPEC	AS SHOWN FIGURE
TEST	TP2
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR1

<STEP 1>

1. OSCILLOSCOPE : TP2
2. Adjust VR1 so that the output waveform is as shown below.



16. VIDEO/AUDIO REC (L2) BOARD

16-1. PLL (1) ADJUSTMENT

SPEC	AS SHOWN FIGURE
TEST	TP8602, TP8601
MODE	PITCH CONTROL ± 15%
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8601[B6]

<STEP 1>

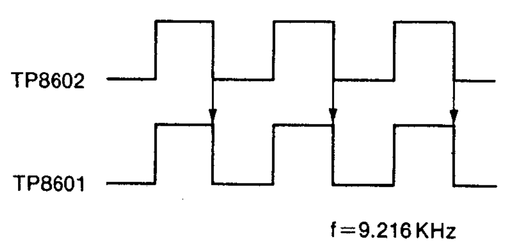
1. SCOPE CH1 : TP8602 (TRIGGER)
   CH2 : TP8601
2. MENU CONDITION

HOME MENU SET UP → PRPL ON
Set the Program play to ± 15%

3. Confirm that the waveforms are locked as shown in figure.

<STEP 2>

1. If it is not, adjust VR8601 so that the waveform are locked.



16-2. PLL (2) ADJUSTMENT

SPEC	AS SHOWN FIGURE
TEST	TP8605, TP8604
MODE	PITCH CONTROL ± 15%
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8602[D5]

<STEP 1>

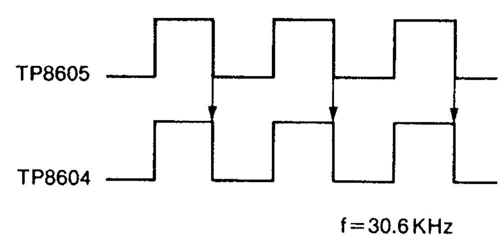
1. SCOPE CH1 : TP8605 (TRIGGER)
   CH2 : TP8604
2. MENU CONDITION

HOME MENU SET UP → PRPL ON
Set the Program play to ± 15%

3. Confirm that the waveforms are locked as shown in figure.

<STEP 2>

1. If it is not, adjust VR8602 so that the waveform are locked.



16-3. PLL (3) ADJUSTMENT

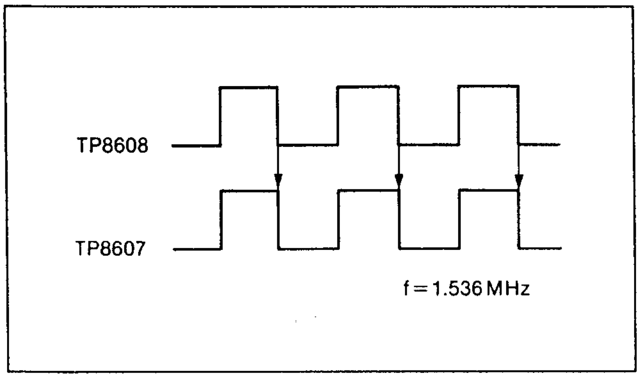
SPEC	AS SHOWN FIGURE
TEST	TP8608, TP8607
MODE	PITCH CONTROL ± 15%
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8603[D4]

<STEP 1>

1. SCOPE CH1 : TP8608 (TRIGGER)
   CH2 : TP8607
2. MENU CONDITION
   HOME MENU SET UP → PRPL ON
   Set the Program play to ± 15%
3. Confirm that the waveforms are locked as shown in figure.

<STEP 2>

1. If it is not, adjust VR8603 so that the waveform are locked.



17. SYSTEM CONTROL (S7) BOARD

SPEC	2.00V ± 0.01V
TEST	TP1[B3]
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1[A4]

<STEP 1>

1. MENU CONDITION
   TEST → RF → REC CNT → (cursor center)
2. Memorize the REC current value and adjust the REC current value are +127 on the every channels.

<STEP 2>

1. SCOPE CH1 : TP1
2. Adjust VR1 so that the output level is 2.00V ± 0.01VDC.
3. Reset the REC current value to original position.

NTSC

ECTRUM ANALYZER SETUP (MODEL HP8591A)

1. SETUP --- REG 1

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

2. SETUP --- REG 2

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

3. SETUP --- REG 3

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) START FREQUENCY	20MHz
(5) STOP FREQUENCY	0MHz
(6) RES BW	300kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIMER	30msec
(9) TRIGGER	FREE RUM

4. SETUP --- REG 4

ITEM	PARAMETER
(1) REF LEVEL	-10dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FRQUENCY	50MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	10

5. SETUP --- REG 5

ITEM	PARAMETER
(1) REF LEVEL	-20dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FREQUENCY	50MHz
(6) RES BW	1kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)

6. SETUP --- REG 6

ITEM	PARAMETER
(1) REF LEVEL	-15dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	27.5MHz
(5) STOP FREQUENCY	0MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	200msec
(9) TRIGGER	EXT (HEAD SW)
(10)VID AVG	5

Electrical Adjustment

PAL

Panasonic
Broadcast Systems

ELECTRICAL ADJUSTMENT PROCEDURES

CONTENTS

RECOMMEND TEST AND SERVICE EQUIPMENT

PART No.	NAME	REMARK
TSG273	DIGITAL COMPOSITE SIGNAL GENERATOR	TEKTRONIX
1411	COMPOSITE SIGNAL GENERATOR	TEKTRONIX
2467B	400MHz OSCILLOSCOPE	TEKTRONIX
1751	SCH METER	TEKTRONIX
521A	VECTOR SCOPE	TEKTRONIX
	DIGITAL VOLT METER	
	FREQUENCY COUNTER	
	VTVM	FREQUENCY BAND WIDTH 4Hz ~ 500KHz
	DIGITAL MULTI METER	
	DISTORTION METER	
HP8591A	SPECTRUM ANALYZER	HEWLETT PACKARD
	AUDIO ANALYZER (or RC OSCILLATOR)	
TYPE 5012	DIGITAL AUDIO SIGNAL GENERATOR	PRO-BEL

How to read a table for adjustment.

TEST	Test points for scope and [Location on the Board]
MODE	Set VTR this mode
TAPE	Alignment Tape portion or work tape
M.EQ	Measurement Equipment
INPUT	Input the signal to VTR specified here
ADJ.	Adjustment portion and [Location on the Board]

1.AUDIO A/D D/A, VIDEO D/A (L1) BOARD [AUDIO SECTION]

1-1.A/D REFERENCE LEVEL ADJUSTMENT

SPEC	0dBm ± 0.05dB
TEST	TP302 (CH1)[C2], TP305 (CH2)[C3], TP312 (CH3)[C5], TP315 (CH4)[C7]
MODE	EJECT, EE2
TAPE	
M.EQ	VTVM
INPUT	1kHz 0dBm Sinewave Signal to AUDIO IN (CH1 to CH4)
ADJ.	VR301 (CH1)[B2], VR302 (CH2)[B3], VR304 (CH4)[B7]

4000 SERIES
<STEP 1>
MACHINE CONDITION
1.INPUT ATT SELECT SW 0dBm
(on the AUDIO IN/OUT Board)
2.OUTPUT ATT SELECT SW 0dBm
(on the AUDIO IN/OUT Board)
3.INPUT IMPEDANCE SW .... HIGH
(on the AUDIO IN/OUT Board)

<STEP 2>
MENU CONDITION
AUDIO IN MENU
Select the AUDIO INPUT LEVEL to "UNITY"

(CH1 ~ CH4 : F1 ~ F4)

<STEP 3>
1.VTVM:LINE OUT (CH1)
LINE OUT (CH2)
LINE OUT (CH3)
LINE OUT (CH4)
2.Adjustment VR:VR301 (CH1)
VR302 (CH2)
VR303 (CH3)
VR304 (CH4)
SPECIFICATION:
VR301, VR302:0dBm ± 0.05dB
VR304, VR303

<STEP 4>
1.VTVM:TP301 (CH1)
TP302 (CH2)
TP303 (CH3)
TP304 (CH4)
2.Confirm that the Audio level is within the specification as shown.
SPECIFICATION :+9.30dBm ± 0.5dB

<STEP 5>
1.VTVM:TP303 (CH1)
TP306 (CH2)
TP313 (CH3)
TP316 (CH4)
2.Confirm that the Audio level is within the specification as shown.
SPECIFICATION:-9.7dBm ± 0.2dB

1-2.AUDIO OUTPUT LEVEL ADJUSTMENT

SPEC	0dBm ± 0.2dB
TEST	LINE OUT : (CH1), (CH2), (CH3), (CH4) (MONI LCH), (MONI RCH)
MODE	EJECT, EE2
TAPE	
M.EQ	VTVM
INPUT	1kHz 0dBm Sinewave Signal to AUDIO IN (CH1 to CH4)
ADJ.	VR601 (CH1)[F2], VR602 (CH2)[G2], VR603 (CH3)[I2], VR604 (CH4)[J2], VR605 (MONI LCH)[K2], VR606 (MONI RCH)[M2]

<STEP 1>
MENU CONDITION
AUDIO IN MENU
Select the AUDIO INPUT
LEVEL to "OFF" : F7 (EMPHASIS)

<STEP 2>
1. VTVM : CH1 LINE OUT
CH2 LINE OUT
CH3 LINE OUT
CH4 LINE OUT
MONI LCH OUT
MONI RCH OUT

2. Adjustment VR : VR601 (CH1)
VR602 (CH2)
VR603 (CH3)
VR604 (CH4)
VR605 (MONI LCH)
VR606 (MONI RCH)

(SPECIFICATION)
Each CH Output Level : +0dBm ± 0.5dB

Note: If there is some noise at monitor out, please adjust L601 ~ L606, L201.

1. AUDIO A/D D/A, VIDEO D/A (L1) BOARD [VIDEO SECTION]

MENU CONDITION
AUDIO IN MENU
Select the VIDEO INPUT F3 to "DIGITAL"

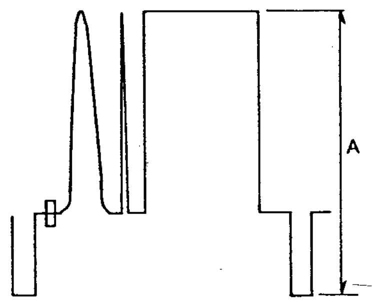
VIDEO OUT SET UP MENU
Select the VIDEO STANBY OFF to "EE2"
STANBY OFF
VIDEO : EE2

1-1. VIDEO OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	1V ± 0.002Vpp
TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	PULSE & BAR to DIGITAL IN
ADJ.	VR1 (D/A LEVEL)[A8]

<STEP 1>
1. SCH METER : VIDEO 1 OUT
2. Adjust VR1 so that the Video level "A" is 1V ± 0.002Vp-p as shown in Figure.

<STEP 2>
1. SCH METER : VIDEO 2 OUT
   VIDEO 3 OUT
2. Confirm that the Video level "A" is 1V ± 0.002Vp-p.



SPEC: A=1V±0.002vp-p

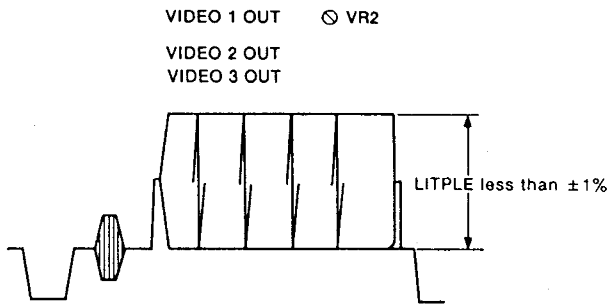
1-2. VIDEO OUTPUT FREQUENCY ADJUSTMENT (1) (L1 : VIDEO D/A)

SPEC	LITPLE
TEST	VIDEO 1 OUT, VIDEO 2 OUT, VIDEO 3 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL H SWEEP to DIGITAL IN
ADJ.	VR2 [L8]

<STEP 1>
1. SCH METER : VIDEO 1 OUT
2. Adjust VR2 so that the Frequency Response is flat as shown in Figure.

<STEP 2>

1. SCH METER : VIDEO 2 OUT
   VIDEO 3 OUT
2. Confirm that the Frequency Response is flat as shown in Figure.



SPEC: LITPLE is less than 1%

1-3. VIDEO OUTPUT FREQUENCY ADJUSTMENT (2) (L1 : VIDEO D/A)

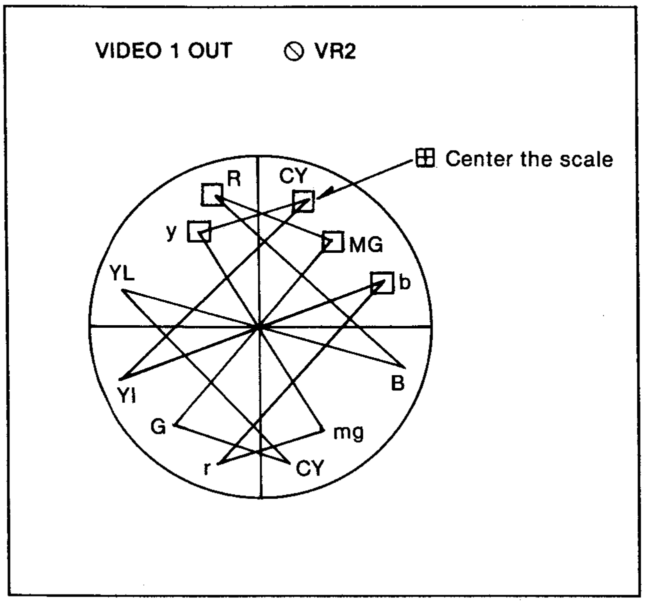
SPEC	CENTER OF THE SCALE
TEST	VIDEO 1 OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR2 [L8]

<STEP 1>

1. VECTOR SCOPE : VIDEO 1 OUT
2. Adjust VR2 so that the each vector is in center the scale of Vector Scope.

<STEP 2>

1. Confirm that the each vector position is in the box of vector when put back the LI board into the VTR.



1-4. VIDEO OUTPUT DC LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	0V ± 20mV
TEST	TP4 [J8]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR4 (CLAMP DC LEV)[L7]

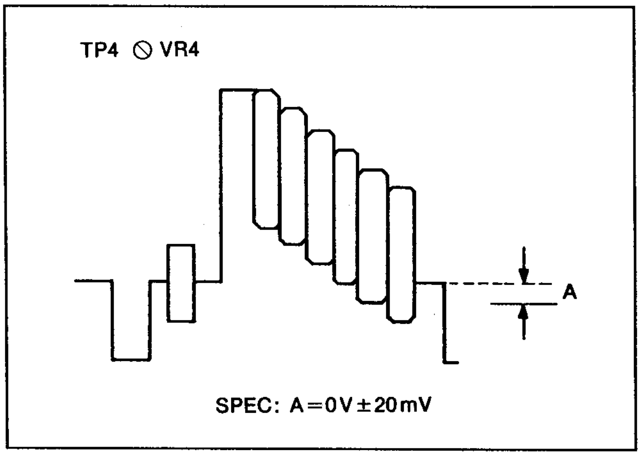
<STEP 1>

MACHINE CONDITION

Connect the 75Ω termination to VIDEO 1 OUT.

<STEP 2>

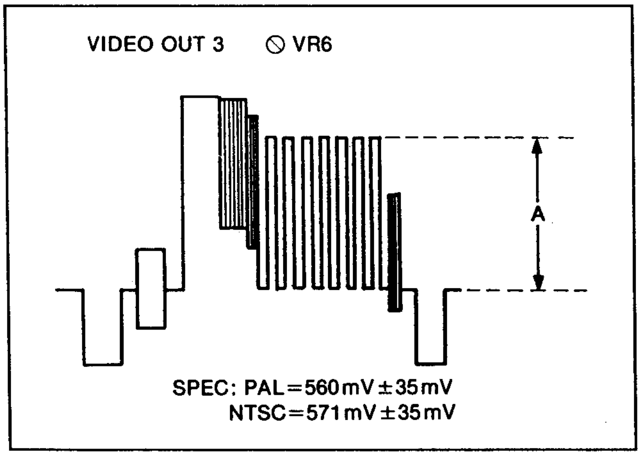
1. SCOPE : TP4
2. Adjust VR4 so that the Pedestal DC level is 0V ± 20mV as shown in Figure.



1-5. CHARACTER LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	560mV ± 35mV
TEST	VIDEO 3 OUT (SUPER)
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR6 (CHAR LEVEL)[J8]

<STEP 1>
1. SCH METER : VIDEO 3 OUT
2. Adjust VR6 so that the Character level "A" is 80IRE ± 5IRE as shown in Figure. NTSC=571mV ± 35mV.

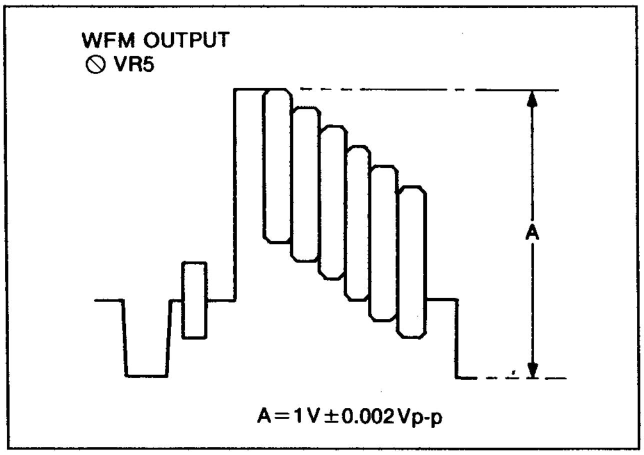


1-6. WFM OUTPUT LEVEL ADJUSTMENT (L1 : VIDEO D/A)

SPEC	1V ± 0.002Vpp
TEST	WFM OUTPUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	DIGITAL COLOR BAR to DIGITAL IN
ADJ.	VR5 (RET V LEVEL)[L6]

<STEP 1>
MENU CONDITION
VIDEO OUT MENU : F9
Select the WFM to A.INPUT

<STEP 2>
1. SCH METER : WFM OUTPUT
2. Adjust VR5 so that Input level "A" is 1V ± 0.002Vp-p as shown in Figure.



<STEP 3>
MENU CONDITION
VIDEO OUT MENU : F9
Select the WFM to "OUTPUT"

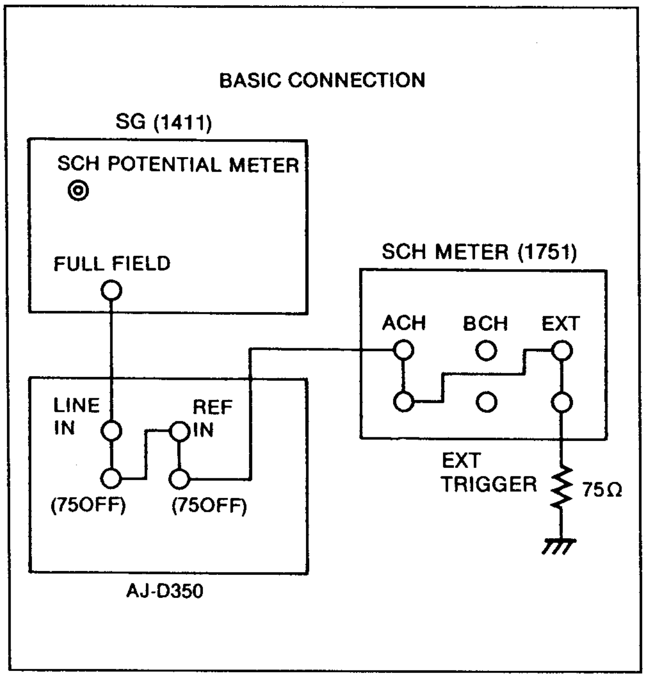
<STEP 4>
1. SCH METER :WFM OUTPUT
2. Confirm that the Output level "A" is 1V ± 0.002Vp-p as shown in Figure.

Refer to above Figure in <STEP 2>

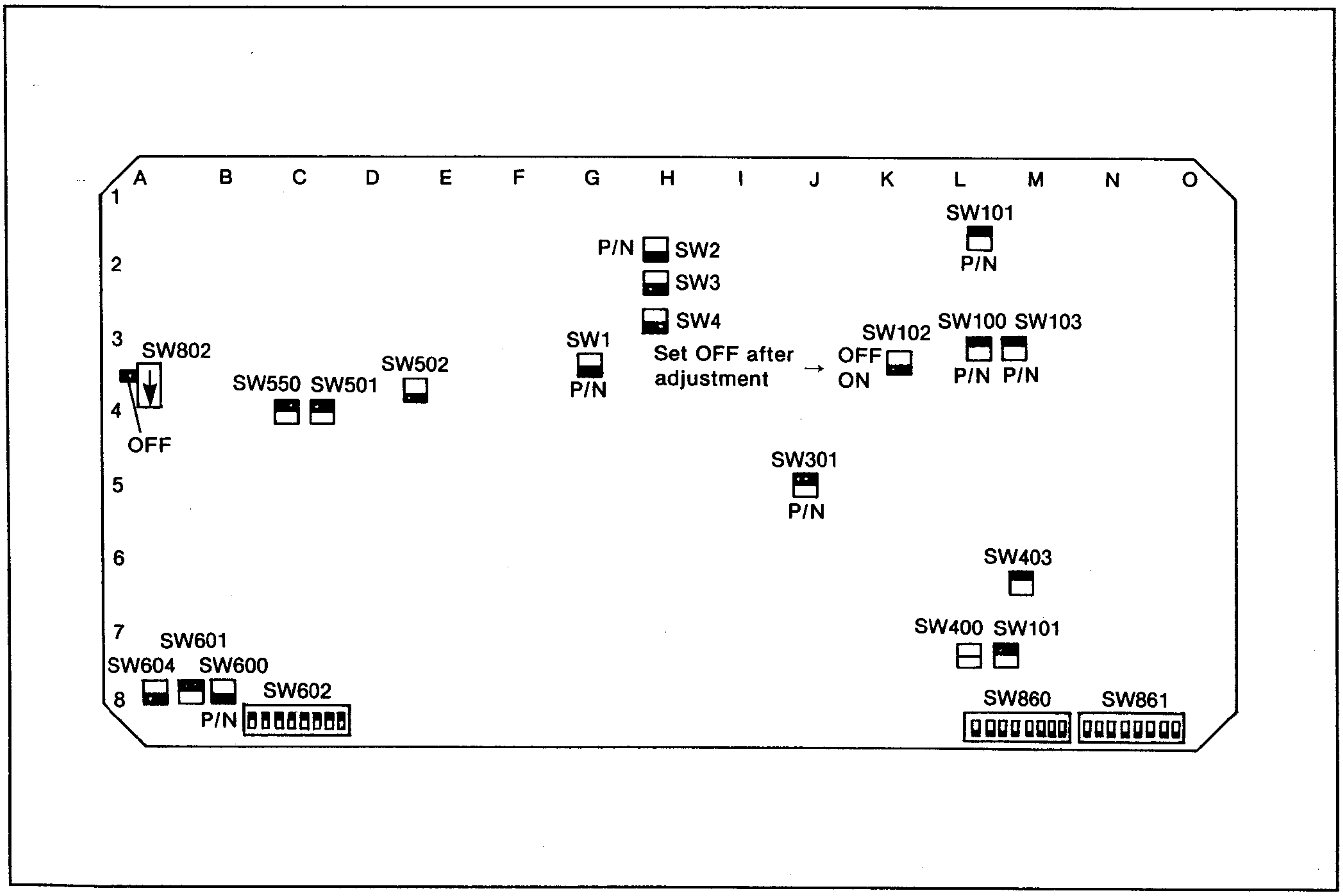
4. VIDEO PROCESS (L4) BOARD

Adjustment with this section, perform after completed adjustment with L1 section.
MENU CONDITION 1
AUDIO IN MENU
Select the VIDEO INPUT F3 to "ANALOG"
VIDEO OUT SET UP MENU
Select the VIDEO STANBY OFF to "EE2"
STANBY OFF
VIDEO : EE2
MENU CONDITION 2
TEST MENU
VIDEO FUNCTION
Press the SCH F10 Key on the Front Panel and display the OUT REF SCH METER.

MACHINE CONDITION (SET UP CONDITION 1)

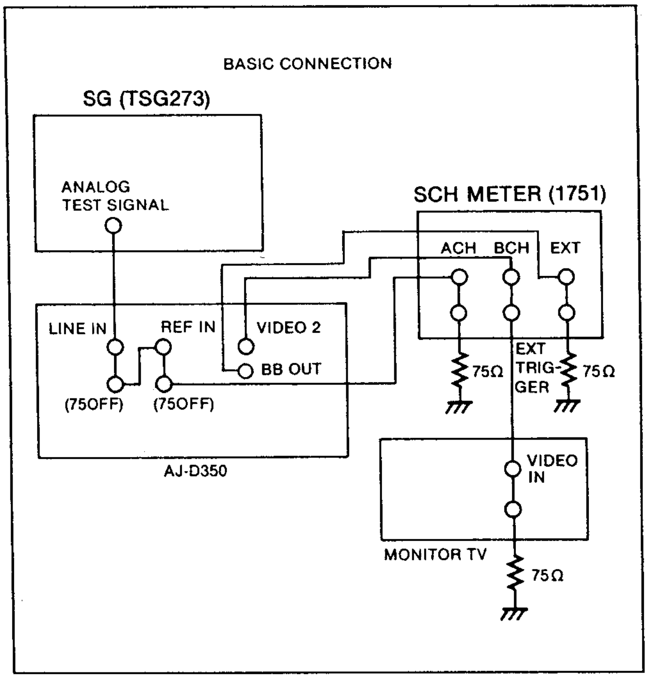


ADJUSTMENT SECTION
4-7. SCH METER ADJUSTMENT
4-9. REF CF DETECTION (3) ADJUSTMENT
4-6. REF SCH ADJUSTMENT



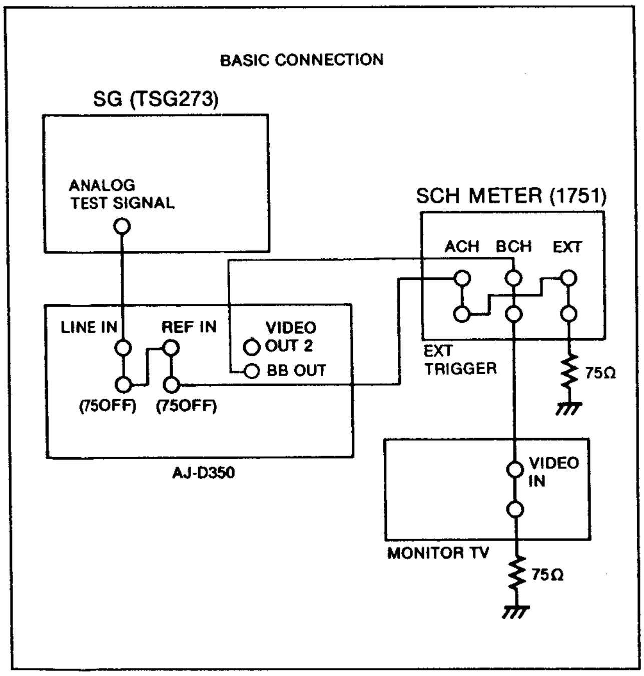
SWITCH POSITION IS BLACK SIDE

MACHINE CONDITION (SET UP CONDITION 2)



ADJUSTMENT SECTION
4-11. SYS SC PHASE ADJUSTMENT
4-12. SYS SC PHASE (2) ADJUSTMENT

MACHINE CONDITION (SET UP CONDITION 3)



ADJUSTMENT SECTION
4-13. BB OUT SYNC LEVEL ADJUSTMENT
4-14. BB OUT SC PHASE ADJUSTMENT
4-15. BB OUT SCH ADJUSTMENT
4-16. BB OUT H PHASE (1) ADJUSTMENT
4-17. BB PIT H PHASE (2) ADJUSTMENT
4-18. BB OUT BURST LEVEL ADJUSTMENT
4-19. BB OUT BURST POSITION & WIDTH ADJUSTMENT

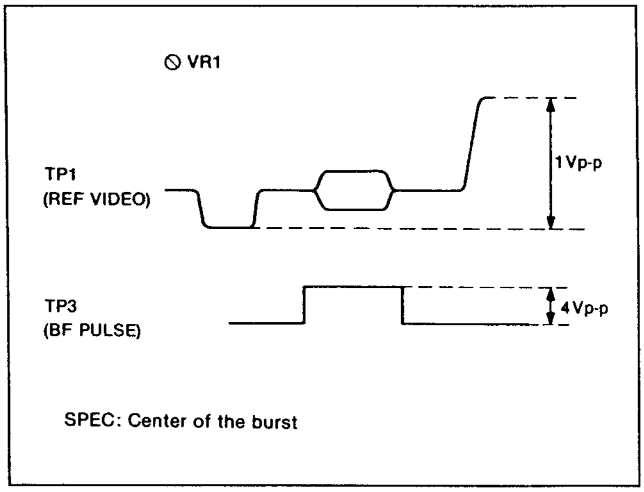
4-1. BF PULSE POSITION ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	BURST IS CENTER OF BF PULSE
TEST	TP9[I1], TP1[I3], TP3[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	70% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR1 (BF POS)[F3]

8000 SERIES

<STEP 1>
1. SCOPE : TP9
2. Confirm that the DC voltage is 2.25 ± 0.1V DC

<STEP 2>
1. SCOPE CH1 : TP1
   CH2 : TP3
2. Adjust VR1 so that the BF pulse is centered on the burst signal as shown in Figure.



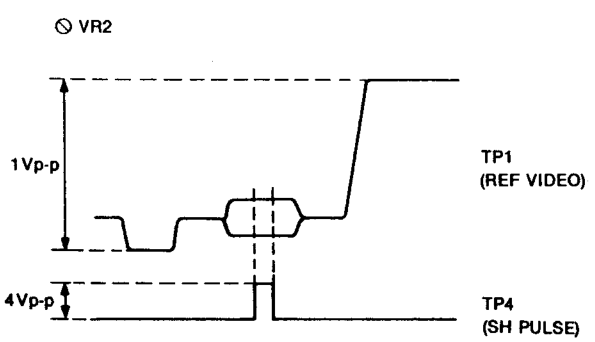
PAL

4-2. SH PULSE POSITION ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	SH PULSE IS CONTER OF BURST
TEST	TP1[I3], TP4[G3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR2 (SH POS)[F3]

<STEP 1>

1. SCOPE CH1 : TP1
   CH2 : TP4
2. Adjust VR2 so that the SH pulse is located at center of the burst signal as shown in Figure.



SPECIFICATION: Burst is at center of TP3 pulse

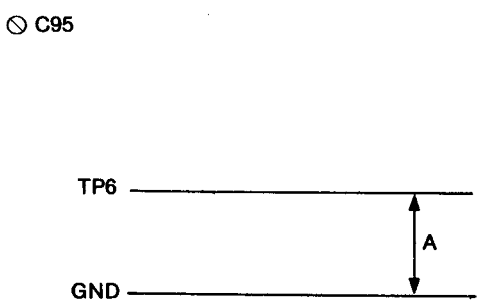
4-3. REF PLL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	0V ± 0.1V DC
TEST	TP6 [I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	C95 (REF CLK FREQ)[I1]

8000 SERIES

<STEP 1>

1. SCOPE CH1 : TP6
2. Adjust C95 so that the DC voltage is 0 ± 0.1V DC.



SPECIFICATION: A=0±0.1V DC

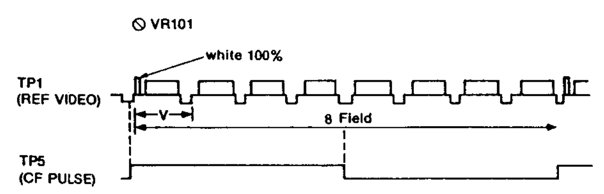
4-4. REF CF DETECTION ADJUSTMENT (1) (L4 : VIDEO PROCESS)

TEST	TP1 [I3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 FLAT FIELD to VIDEO IN and REF VIDEO IN
ADJ.	VR100 (SCH DET 1)[L1], VR101 (SCH DET 2)[M1], VR102 (LEVEL DET)[L2]

8000 SERIES

<STEP 1>

1. Confirm that the jumper SW102 is set to ON side.
2. SCOPE CH1 : TP1
   CH2 : TP5
3. Set the VR100 and VR102 to center position.
4. Adjust VR101 so that the CF Pulse rise on head portion of color frame.



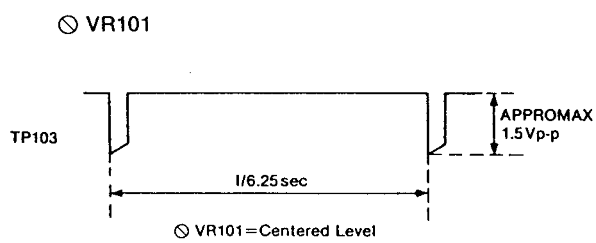
4-5. REF SCH DETECTION ADJUSTMENT (1) (L4 : VIDEO PROCESS)

TEST	TP5 [H2], TP103 [M3]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 75% COLOR BAR to VIDEO IN and REF VIDEO IN
ADJ.	VR101 (SCH DET 2)[M1], VR100 (SCH DET 1)[L1]

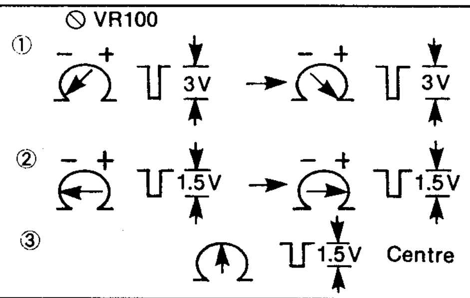
8000 SERIES

<STEP 1>

1. SCOPE CH1 : TP103
   CH2 : TP5
2. Confirm that pulse signal of TP103 level is changed, when turn VR101 to clockwise ot counter-clockwise.
3. Adjustment VR101 so that the pulse at TP103 is centered level between minimum (0V) and maximum (2 ~ 3V).



4. If VR101 is rotated too much, pulse position may be appeared at center of the pulses and color frame phase may be inverted.
5. Adjust VR100 so that the center between left and right side position which keep about 1.5V as shown in figure.



4-6. SCH METER ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	SCH METER DISPLAYED +45°
TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1411 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR105 (SCH GAIN)[K4], VR106 (SCH OFFSET)[K4]

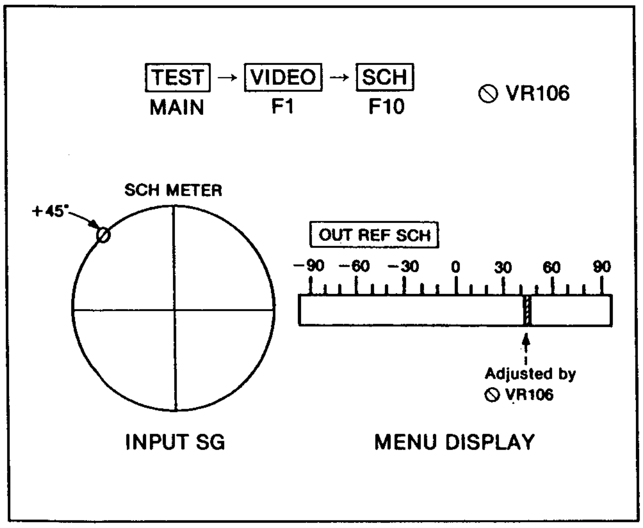
8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to figure shown below.

<STEP 2>
1. Set VR105, VR106 to center position.
2. SCH METER : SCH MODE
3. Adjust the Potention Meter VR on 1411 so that the SCH phase becomes +45° at SCH METER.(Page 6)
4. Display the OUT REF SCH METER as follows.

   TEST → F1 VIDEO → F10 SCH

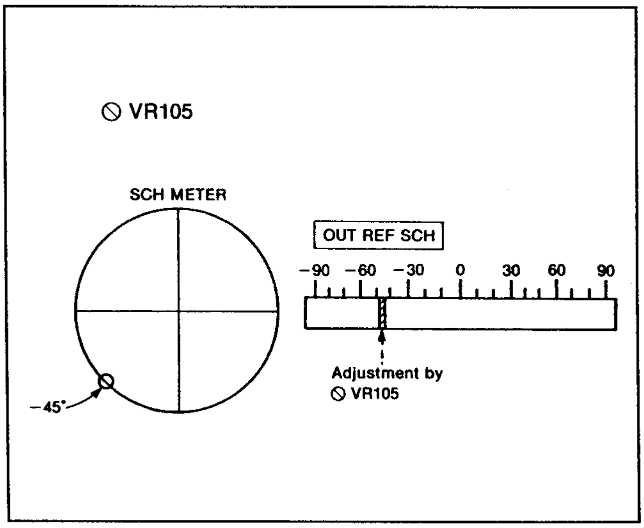
5. Adjust VR106 so that the OUT REF SCH METER displayed +45°.



<STEP 3>
1. Adjust the Potention Meter VR on 1411 so that the SCH phase becomes -45° at SCH METER.
2. Display the OUT REF SCH METER VR follows.

   TEST → F1 VIDEO → F10 SCH

3. Adjust VR105 so that the OUT REF SCH METER displayed -45°.



<STEP 4>
1. Re-adjust above <STEP 2> and <STEP 3> until stabilize the position of VR105 and VR106.

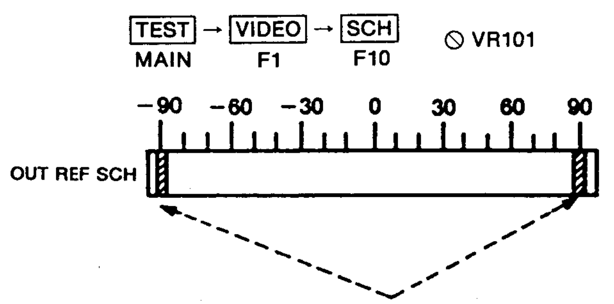
4-7. REF CF DETECTION ADJUSTMENT (2)

SPEC	SHOWN BELOW
TEST	OUT REF SCH Meter on TEST VIDEO Menu
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	1411 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR101 (SCH DET 2) [M1]

<STEP 1>
MACHINE CONDITION
Refer to SET UP CONDITION 1

<STEP 2>

1. Adjust the Potention Meter VR on 1411 so that the OUT SCH is displayed -90°.
2. Precisely adjust VR101 so that the OUT SCH displayed +90°, -90° inversely.



SPECIFICATION: Displayed +90°, −90°, inversely.

4-8. REF SCH DETECTION ADJUSTMENT (2) (L4 : VIDEO PROCESS)

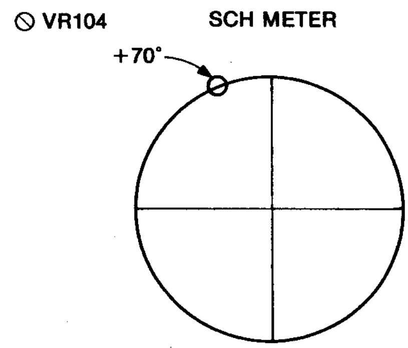
SPEC	TP105 - TP104 ± 20mV
TEST	TP104[L3], TP105[J3], TP106[J3]
MODE	EE2 (EJECT), SW102 [K3] ON (DOWN)
TAPE	
M.EQ	SCH METER (OSCILLOSCOPE)
INPUT	1410 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR103 (SCH -L)[J2], VR104 (SCH -H)[J2]

8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 1 at the beginning of this SECTION.(Page 6)

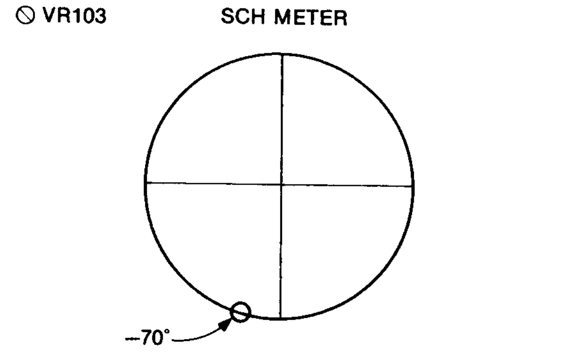
<STEP 2>

1. SCH METER : SCH MODE
2. Adjust the Potention Meter VR on 1411 so that the SCH phase becomes +70° at SCH METER.
3. SCOPE CH1 : TP106
   CH2 : TP104
4. Measure the voltage at TP104.
5. Adjust VR104 so that the DC voltage at TP106 is TP104 ± 20mV.



SPECIFICATION: TP106=TP104±20mV

<STEP 3>
1. Adjustment the Potention Meter VR on 1411 so that the SCH phase becomes -70° at SCH METER.
3. SCOPE CH1 : TP105
   CH2 : TP104
4. Measure the voltage at TP104.
5. Adjust VR103 so that the DC voltage at TP105 is TP104 ± 20mV.



SPECIFICATION: TP105=TP104±20mV

<STEP 4>
1. Set SW102 to OFF (UP).

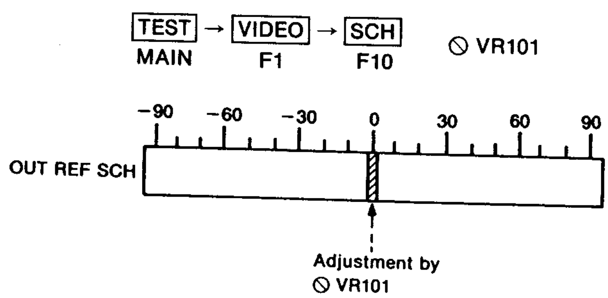
4-9. REF SCH DETECTION ADJUSTMENT (3) (L4 : VIDEO PROCESS)

SPEC	SCH METER IS 0°
TEST	OUT REF SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN, SCH = 0°
ADJ.	VR101 (SCH DET 2)[M2]

8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>
1. Confirm the test signal generator output SCH is 0°.
2. Turn the power OFF and ON.
3. Display the OUT REF SCH METER on TEST VIDEO MENU.
4. Adjust VR101 so that the OUT REF SCH METER displayed 0°.



SPECIFICATION: 0° on the front panel meter.

PAL

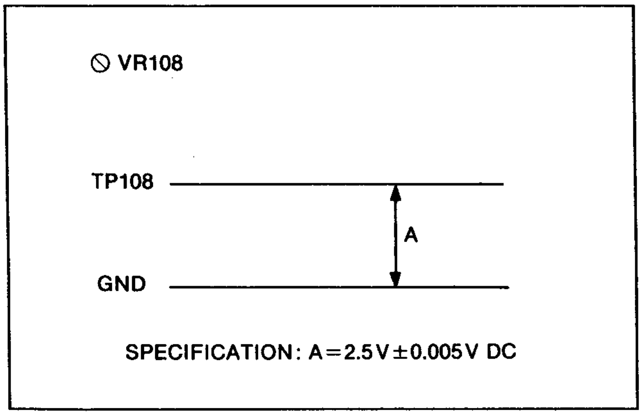
4-10. SYS PLL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	TP108 = 2.5V ± 50mV DC
TEST	TP108[K2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR108[K2]

8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 1 at the beginning of this SECTION.

<STEP 2>
1. SCOPE : TP108
2. Adjust VR108 so that the DC voltage is 2.5V ± 0.005V DC.
   SPECIFICATION : 2.5V ± 0.005V DC



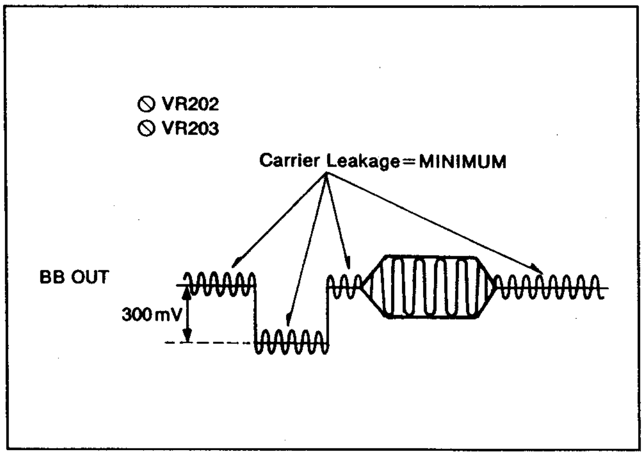
4-11. BB OUT SYNC LEVEL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	SYNC = 300mVpp (VR202) MINIMUM CARRIER LEAKAGE (VR203)
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	ANALOG 75% COLOR BAR to VIDEO IN and REF IN
ADJ.	VR202 (BB SYNC GAIN)[O3], VR203 (BB C LEVEL)[N1]

8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

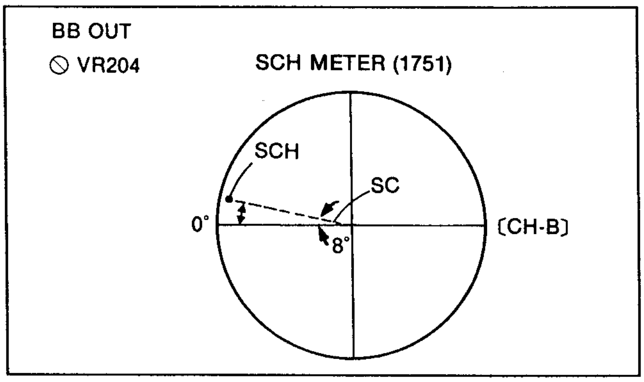
<STEP 2>
1. SCH METER : WFM mode
2. SCH METER INPUT : CHA : SG.VIDEO
   CHB : BB OUT
3. Adjust VR202 so that the Sync level of BB is 300mV as shown in Figure.
   Confirm the sync level is same with CHA (SG Video sync level).
4. Adjust VR203 so that the carrier leak is become minimum.



4-12. BB OUT SC PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

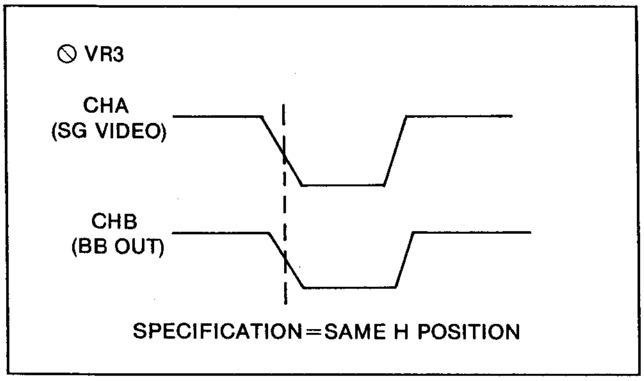
TEST	REF VIDEO BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM, SCH MODE)
INPUT	ANALOG 75% COLOR BAR to VIDEO IN
ADJ.	VR204 (BB C PHASE)[O3], VR3 (H POS 1)[G3], VR5 (H POS 2)[F1]

8000 SERIES



<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>
1. SCH METER : WFM mode, EXT trigger
2. SCH METER INPUT : CHA : SG VIDEO
   CHB : BB OUT
3. Adjust VR3 so that the H phase of BB out is same H sync phase with CHA (SG VIDEO) at training center position. This is a coarse adjustment of VR3.



<STEP 3>
1. SCH METER : SCH mode, EXT trigger
   CHA : SG VIDEO
   CHB : BB OUT
2. Set the SCH meter CHA position at correct position. Select SCH meter to CHB.
3. Adjust VR5 so that the SCH of B.B out delayed +8° against REF IN.
4. Adjust VR204 so that the burst phase delayed +8° against burst on CHA.
5. +8° delay is caused by extention board. The SCH becomes 0°when L4 board is returned to VTR.

4-13. SYS SC PHASE ADJUSTMENT (2) (L4 : VIDEO PROCESS)

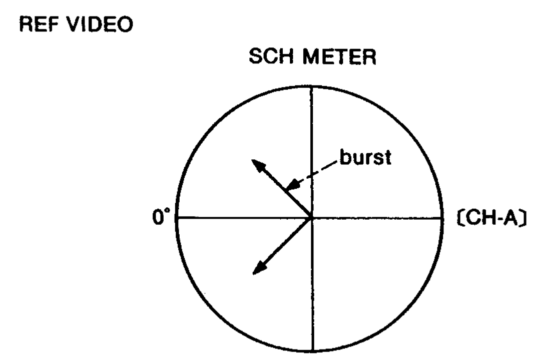
SPEC	REF IN BURST PHASE = VIDEO OUT 2 BURST PHASE
TEST	VIDEO OUT 2
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR107 (SYS SC PHASE)[J2]

8000 SERIES

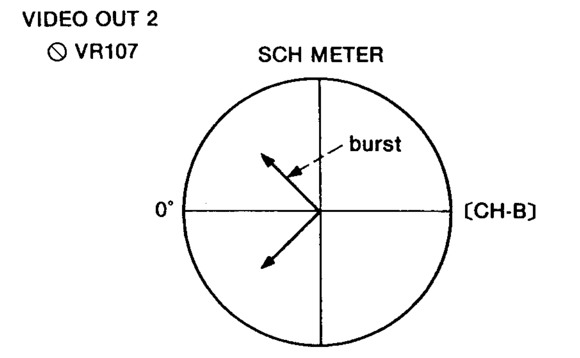
<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 2 at the beginning of this SECTION.

<STEP 2>
MENU CONDITION
VIDEO OUT MENU : F7
Select the SC to "UNITY" mode.

<STEP 3>
1. SCH METER : SCH : MODE
2. SCH INPUT : CHA
3. Adjust the phase VR on SCH METER so that the burst phase becomes standard position at SCH METER.



<STEP 4>
1. SCH INPUT : CHB
2. Adjustment VR107 so that the burst phase becomes the same phase as REF VIDEO (CHA).



Burst phase: CHA=CHB

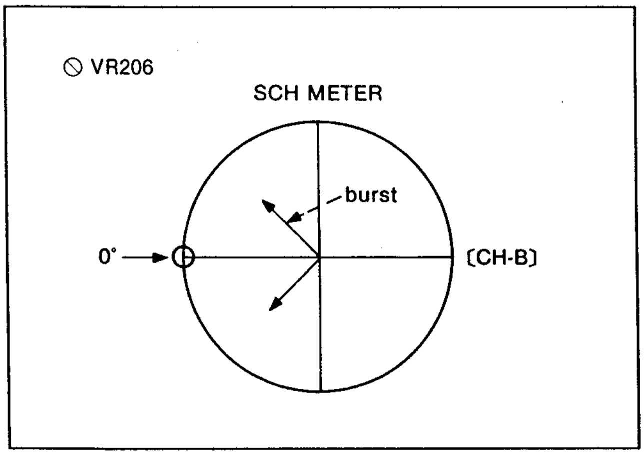
4-14. BB OUT SCH ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	BB OUT SCH = 0°
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR206 (H POS 2 PAL) [N2]

8000 SERIES

<STEP 1>

1. SCH METER : WFM mode
2. SCH METER INPUT : CHB
3. Adjust the Phase VR on SCH METER so that the burst phase becomes standard position at SCH METER.
4. Adjust VR206 so that the SCH phase becomes 0° at SCH METER.



4-15. BB OUT H PHASE ADJUSTMENT (1) (L4 : VIDEO PROCESS)

SPEC	REF VIDEO IN H PHASE = BB OUT H PHASE
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR3 (H POS 1) [G3]

8000 SERIES

<STEP 1>

MACHINE CONDITION

Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>

1. SCH METER : WFM mode
2. SCH METER INPUT : CHA REF VIDEO
   CHB BB OUT
3. Adjust VR3 so that H phase is the same phase against the H phase on CHA.

Note: Adjust VR3 so that the H phase is Value of center stability condition.

4-16. BB OUT H PHASE ADJUSTMENT (2) (L4 : VIDEO PROCESS)

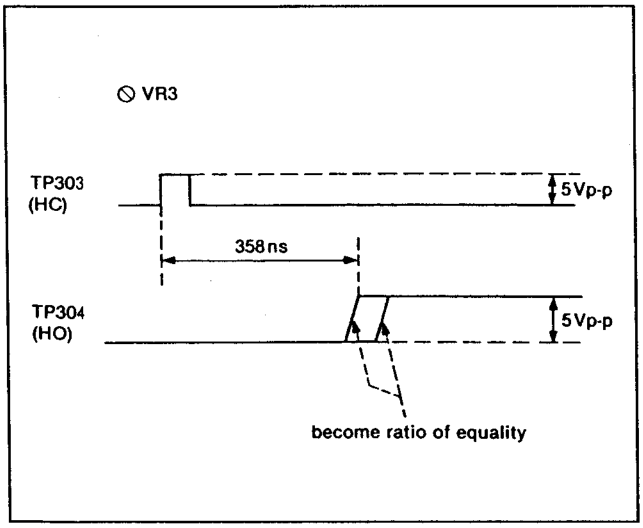
SPEC	TP304 PULSE RATIO IS SAME
TEST	TP303[G3], TP304[H2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR3 (H POS 1)[G3]

8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>
1. SCH METER : WFM mode
2. Confirm that the BB OUT H phase at SCH METER.

<STEP 3>
1. SCOPE CH1 : TP303
   CH2 : TP304
2. SCOPE TRIGGER : CH1
3. Adjust VR3 so that the relation between HC signal and H0 signal as shown in Figure.



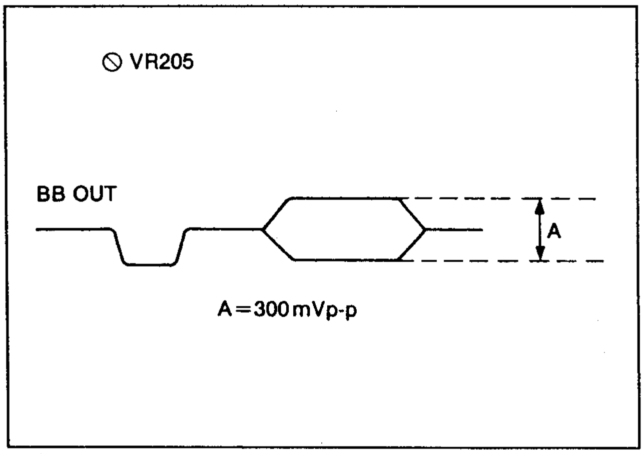
4-17. BB OUT BURST LEVEL ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	BB OUT BURST = 30mVpp
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR205 (BB BS GAIN)[O2]

8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 3 at the beginning of this SECTION.(Page 7)

<STEP 2>
1. SCH METER : WFM mode, EXT trigger
2. SCH METER INPUT : CHA : SG VIDEO
   CHB : BB OUT
3. Adjust VR205 so that the burst level is 300mVp-p.
4. Confirm that the CHB (BB OUT) H phase and burst level on CHA (REF VIDEO).



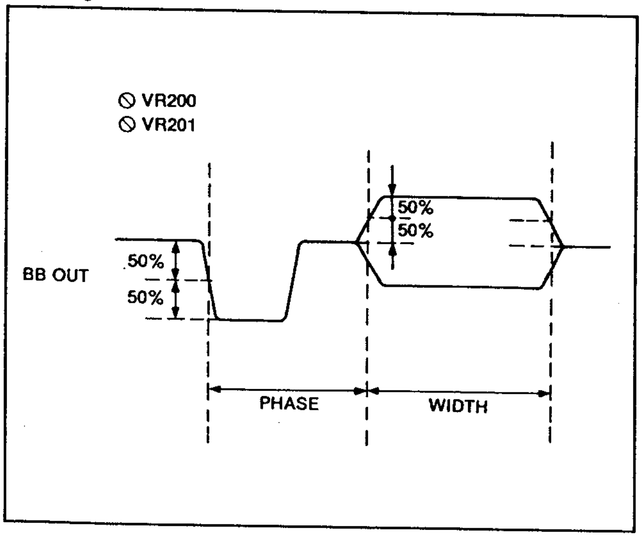
4-18. BB OUT BURST POSITION & WIDTH ADJUSTMENT (L4 : VIDEO PROCESS)

SPEC	REF BURST POSITION = BB BURST POSITION
TEST	BB OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR200 (BB BS POS)[N1], VR201 (BB BS WIDTH)[N1]

8000 SERIES

<STEP 1>
MACHINE CONDITION
Refer to SET UP Condition 3 at the beginning of this SECTION.

<STEP 2>
1. SCH METER : WFM mode
2. Adjust VR200 so that the phase of SYNC (CHB) is mach with the REF signal (CHA) as shown in Figure.
3. Adjust VR201 so that the width of burst (CHB) is match with the REF signal (CHA) as shown in Figure.



4-19. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (1) (L4 : VIDEO PROCESS)

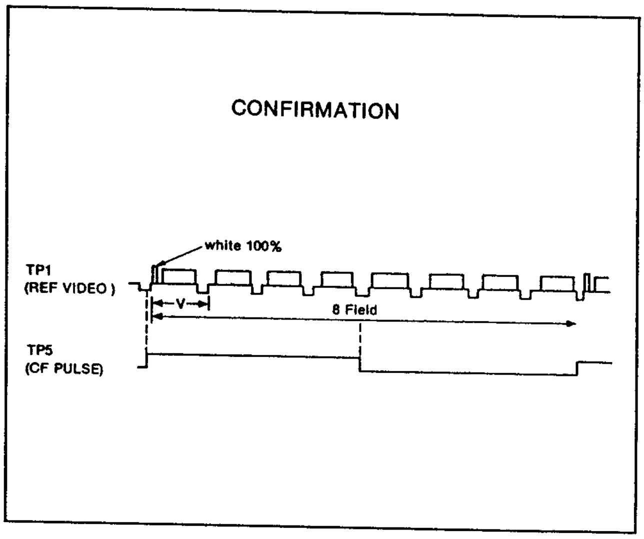
SPEC	CF LOCK
TEST	TP5[H2], TP1[I3], VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	FLAT FIELD 50% to VIDEO IN and REF VIDEO IN
ADJ.	CONFIRMATION

8000 SERIES

<STEP 1>
1. Confirm that the adjustment of L2 and S9 sections are completed.

<STEP 2>
MENU CONDITION
HOME MENU SET UP
Select the OUT REFERENCE to "INCOM".

<STEP 3>
1. SCOPE CH1 : TP1
   CH2 : TP5
2. Confirm that the relation between REF VIDEO and CF pulse is as shown in Figure.
3. If the ID WHITE 100% signal does not appeared on indicated position as shown in Figure, Re-adjustment with INCOME CF DETECTION Adjustment (1), (2) and (4) of S9 Board adjustment Section.



4-20. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (2) (L4 : VIDEO PROCESS)

TEST	VIDEO OUT
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER (WFM MODE)
INPUT	TSG273 COLOR BAR to VIDEO IN and VIDEO IN
ADJ.	VR4 (IH POS)[I4]

8000 SERIES

<STEP 1>
1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>
MENU CONDITION
HOME MENU SET UP
Select the OUT REFERENCE to "INCOM".

<STEP 3>
MACHINE CONDITION
Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>
1. SCH METER : WFM Mode
2. Adjust VR4 so that the H phase on CHB is matched REF signal (CHA).

4-21. SYSTEM H PHASE (OUT REF = INCOM) ADJUSTMENT (3) (L4 :VIDEO PROCESS)

SPEC	TP304 EQUAL RATIO
TEST	TP303 [G3], TP304 [H2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	TSG273 COLOR BAR to VIDEO IN
ADJ.	VR4 (IH POS)[I4] (FINE)

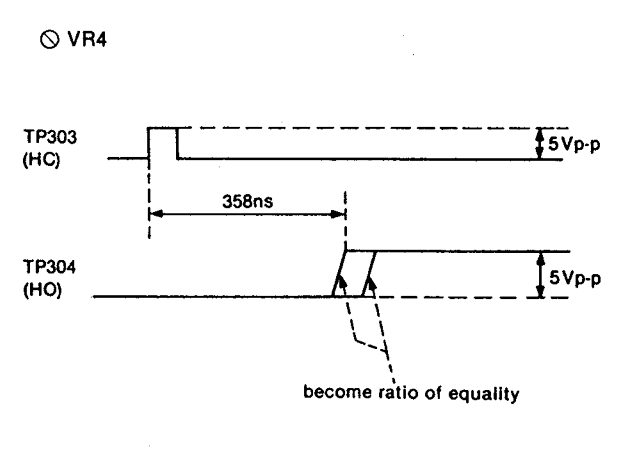
8000 SERIES

<STEP 1>
1. Confirm that the adjustment with L2 and S9 sections completed.

<STEP 2>
MENU CONDITION
HOME MUNU SET UP
Select the OUT REFERENCE to "INCOM".

<STEP 3>
MENU CONDITION
Refer to SET UP CONDITION 2 at the beginning of this SECTION.

<STEP 4>
1. SCOPE CH1 : TP303
   CH2 : TP304
2. SCOPE TRIGGER : CH1
3. Adjust VR4 so that the relation between HC signal as shown in Figure.



4-22. DIGITAL VIDEO OUT CLOCK PHASE ADJUSTMENT (L4 : VIDEO PROCESS)

TEST	DIGITAL VIDEO OUT 25PIN D-SUB
MODE	EE1
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR to VIDEO IN and VIDEO IN
ADJ.	SW860 [M8], SW861 [M8]

8000 SERIES

<STEP 1>

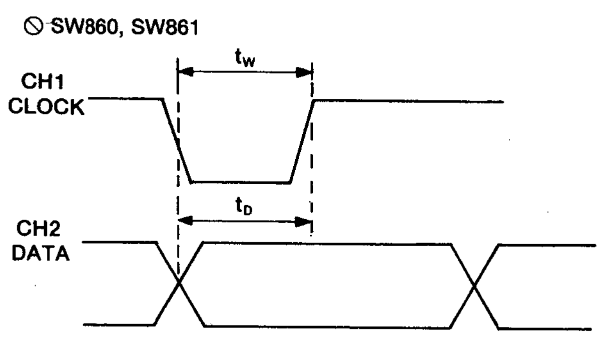
SCOPE CH1 : DIGITAL VIDEO OUT D-SUB 1Pin

SCOPE CH2 : DIGITAL VIDEO OUT D-SUB 7Pin

<STEP 2>

Adjust SW860 and SW861 so that the clock and data phase is shown in figure.

(1) Set SW861-7bit to ON and SW860 -2 bit to ON or set SW861-8bit to ON and set one of the bit of SW861 bit1 - bit5 to ON.



SCOPE 200mV/div., 10nsec/div.

SPECIFICATION t_W=28nsec±5nsec

t_D=28nsec±5nsec

5. REC/PLAY CH0 (S1) BOARD
REC/PLAY CH1 (S2) BOARD

Adjust procedure with S1 and S2 board the same.

MACHINE CONDITION

Set the SW51 on the L2 board to OFF as shown in Figure 1.
Turns Line and Field shuffle off.

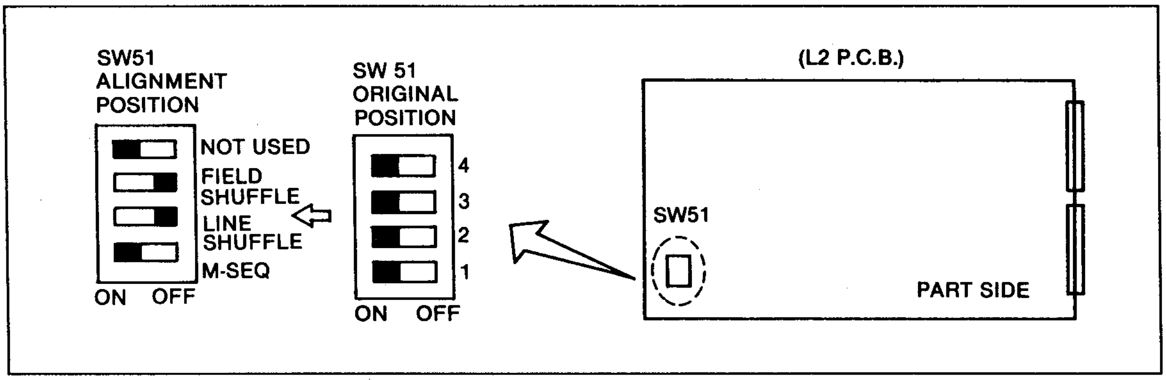
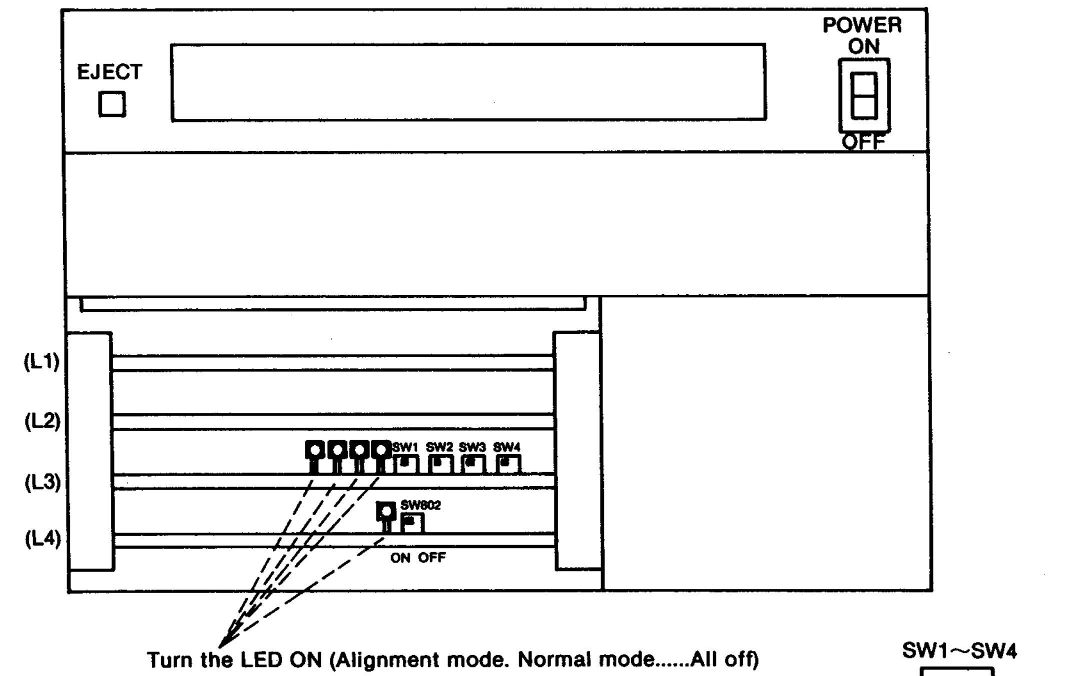


Figure 1.

1. Set the SW1, 2, 3 and 4 on the L3 P.C.B. follow the Figure 2.
2. Set the SW802 on the L4 P.C.B. follow the Figure 2.
3. Confirm that the 5 LED's are turned ON.



SW1 (VIDEO INNER ECC): OFF
SW2 (AUDIO OUTER ECC): OFF
SW3 (AUDIO INTERPOLATION): OFF
SW4 (VIDEO OUTER ECC): OFF
SW802 (CONCEAL ECC): OFF

Figure 2.

Set the Dip SW's on the S1 and S2 P.C.B. follow the as shown in Figure 3.

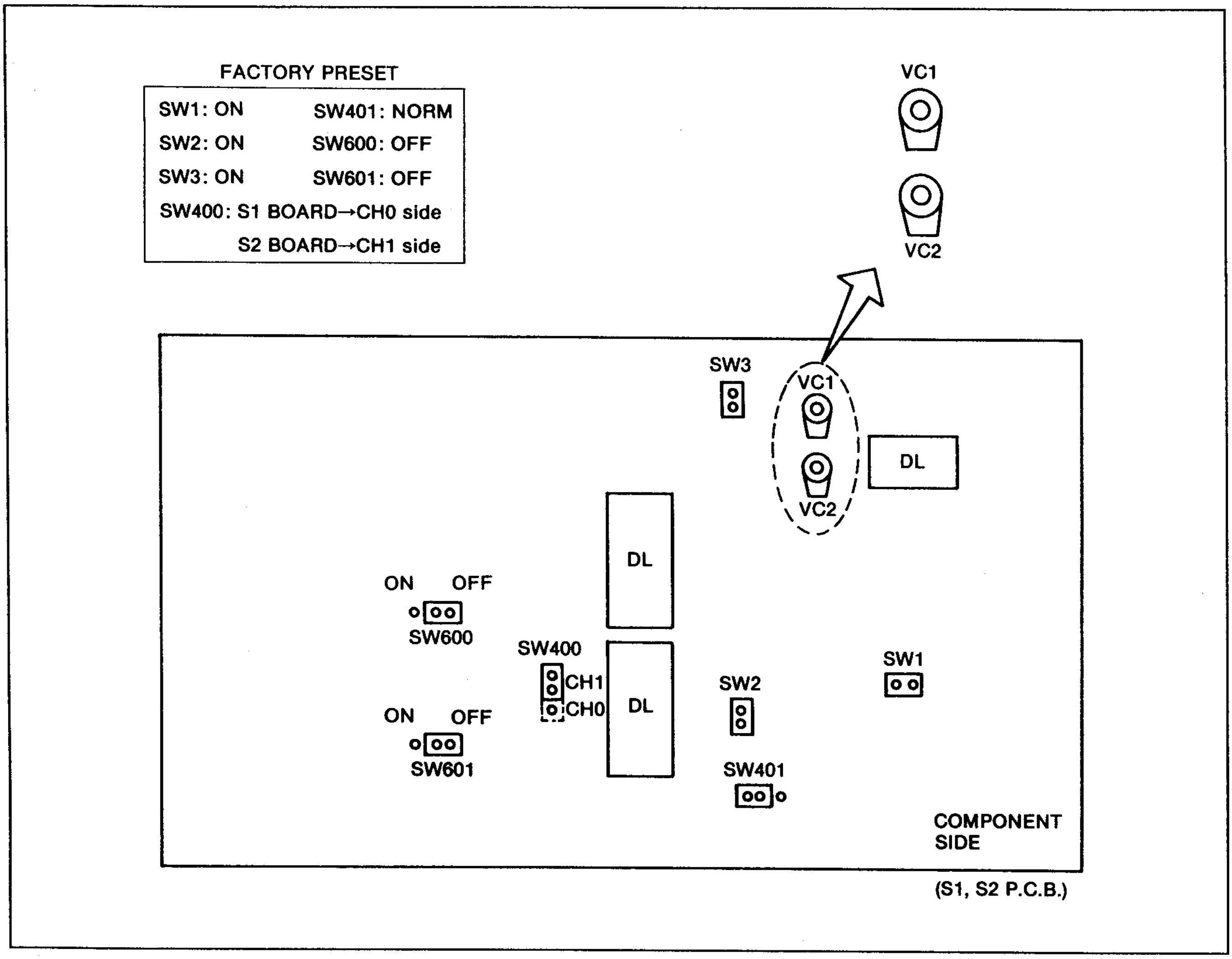
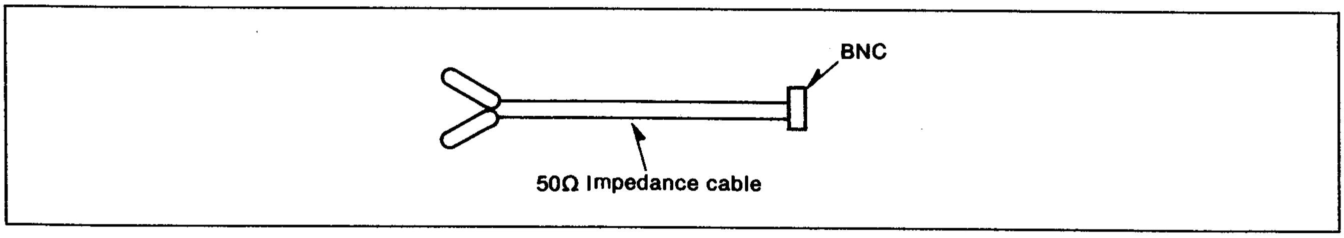
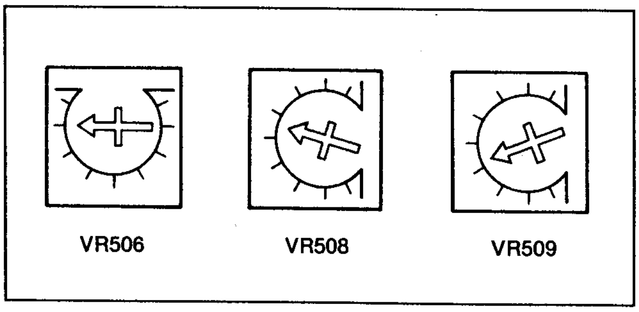


Figure 3.



NOTE :
1. These VRs are not used as follows. VR600, VR601, VR602, VR603, VR604, VR605, VR606, VR607, VR614, VR615
2. Set the VR506, VR508 and VR509 as follows.



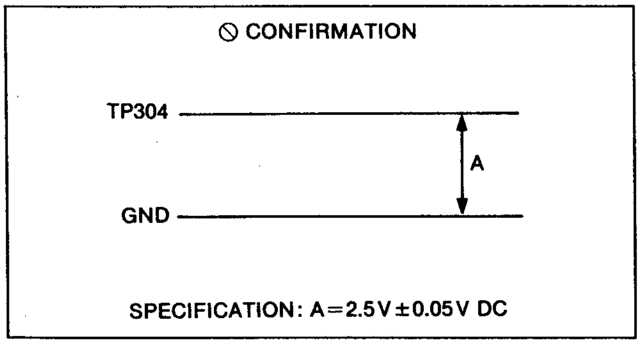
5-1. PLL ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

<STEP 1>

SPEC	TP304 = 2.5V DC ± 0.05V DC
TEST	TP304 [A1]
MODE	VIDEO OUT SET UP STATE EE2, STBY OFF
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	

5000 SERIES

1. SCOPE : TP304
2. Set VTR into STAND BY OFF mode.
3. Confirm that the DC voltage is 2.5 ± 0.05V DC. If it is not confirm the Servo HT (Head Tape relative speed) signal on S5 board.



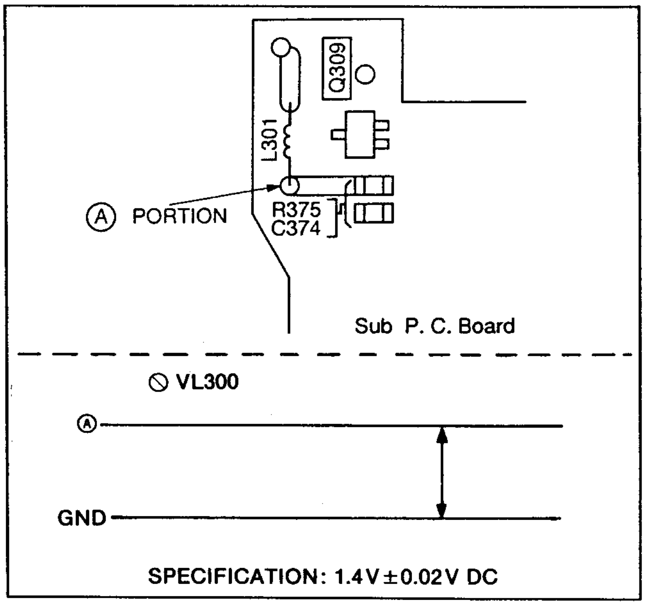
PLL ADJUSTMENT

<STEP 2>

SPEC	1.4V DC ± 0.02V
TEST	L301 lower side in shield case
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VL300 (OSC OFFSET)[B1]

5000 SERIES

1. SCOPE: L301 lower side
2. Adjust VL300 (OSC OFFSET) so that the voltage is 1.4 ± 0.02V DC.



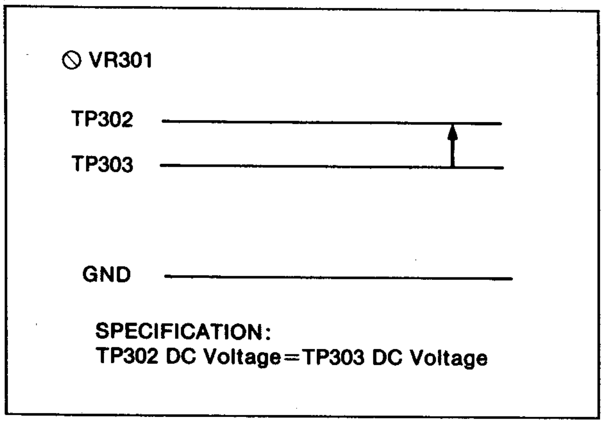
PLL ADJUSTMENT

<STEP 3>

SPEC	TP303 DC VOLT = TP302 DC VOLT
TEST	TP302 [C1], TP303 [B1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR300 (PLL OFFSET)[A1]

5000 SERIES

1. SCOPE CH1 : TP302
   CH2 : TP303
2. Adjust VR300 (PLL OFFSET) so that the voltage of TP302 and TP303 are same.



PLL ADJUSTMENT

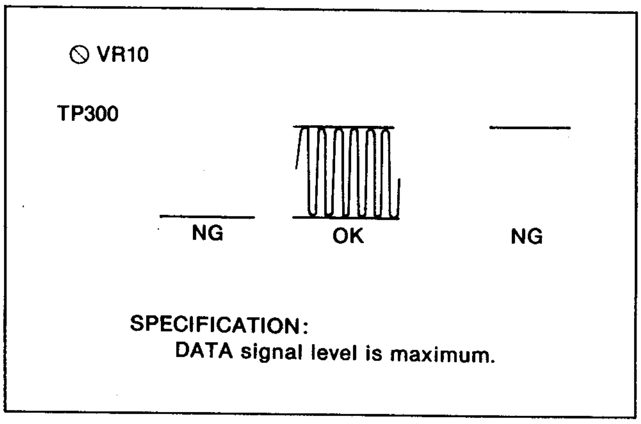
<STEP 4>

SPEC	TP300 IS MAXIMUM PEAK TO PEAK
TEST	TP300 [B2]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR10 (COMP BIASE)[F1]

5000 SERIES

1. Insert an adjustment tape color bar portion.
2. Set the STBY OFF status to "TAPE" mode.
   VIDEO OUT SET UP TAPE
3. Set the VTR into STBY OFF mode.
4. SCOPE : TP300
5. Adjust VR10 (COMP BIASE) so that the data signal level is maximum.

Note: Set the 20MHz Filter of oscilloscope to OFF mode.



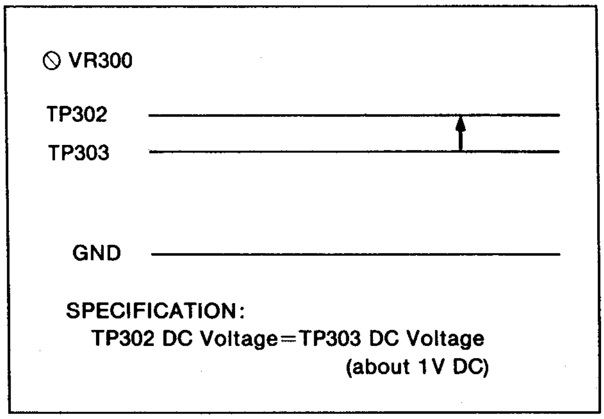
PLL ADJUSTMENT

<STEP 5>

SPEC	TP302 DC VOLTAGE = TP303 DC VOLTAGE
TEST	TP302 [B1], TP303 [B1]
MODE	TAPE mode STBY OFF
TAPE	COLOR BAR
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR301 (DC BALANCE)[C1]

5000 SERIES

1. SCOPE CH1 : TP302
   CH2 : TP303
2. Adjust VR301 (DC BALANCE) so that the voltage of TP302 and TP303 are same.



PLL ADJUSTMENT

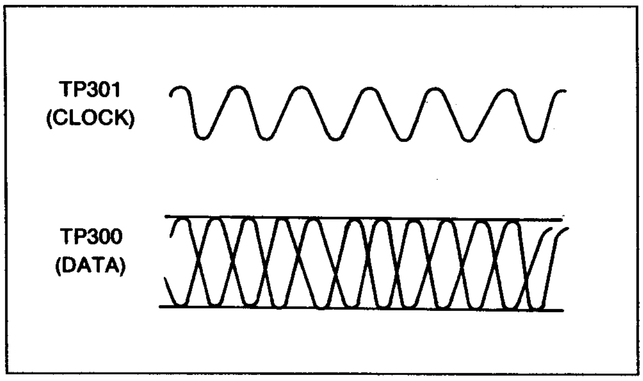
<STEP 6>

SPEC	TP301 CLOCK IS LOCKED WITH TP300
TEST	TP301 [B2], TP300 [B2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	CONFIRMATION ONLY

5000 SERIES

1. Set the STBY OFF status to "EE2" mode.
   VIDEO OUT SET UP
2. SCOPE CH1 : TP301/TPG300
   CH2 : TP300 --- TRIGGER
3. SCOPE : 500mV/AC
   SETTING : SWEEP = 10nsec/div
4. Confirm that the DATA signal and CLOCK signal are frequency locked.

Note: Set the 20MHz Filter of oscilloscope to OFF mode.

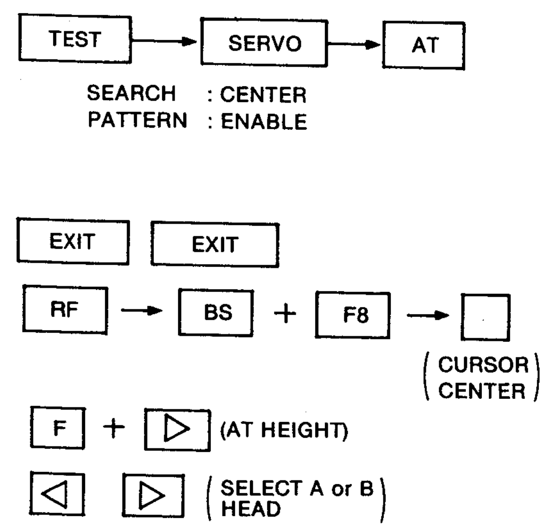


5-2. ENVELOPE MAX ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

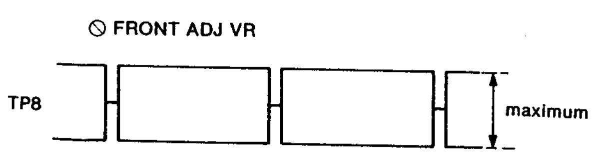
SPEC	RF ENVELOPE IS MAXIMUM
TEST	TP8[E2], P3-B22(RIGHT SIDE) of Extension Board
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	ADJ. KNOB (on the Front Panel), AT HEIGHT

5000 SERIES

<STEP 1>
MENU CONDITION
TEST SERVO AT HEIGHT



<STEP 2>
1. Playback a shuffling off 75% Color bar Alignment Tape on VAR X1 mode.
2. Adjust the Adj. KNOB VR on the Front Panel so that the Envelope is maximum.



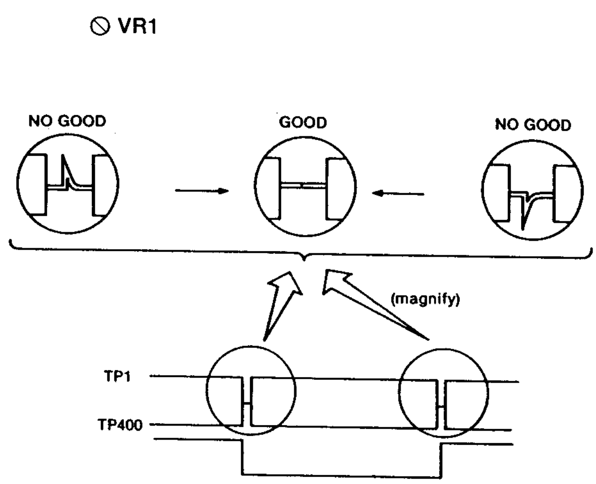
SPECIFICATION: RF Maximum

5-3. AB DC BAL ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	CHA DC = CHB DC
TEST	TP1[H3], TP400[F4]
MODE	VAR (X1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (A/B DC BAL)[H1]

5000 SERIES

<STEP 1>
1. SCOPE CH1 : TP1 : TPG1
   CH4 : TP400
2. SCOPE CH1 : 50mV/DC 50Ω
   CH4 : 5V/DC
3. SCOPE MODE : CH0P
4. SCOPE TRIG : CH4
5. SCOPE SWEEP : A = 2ms/div
   B = 50μS/div
6. Adjust VR1 so that the Envelope is as shown in Figure.



SPECIFICATION: CHA DC=CHB DC

5-4. ENVELOPE DETECTION ADJUSTMENT (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	ENVELOPE MINIMUM DC LEVEL = 0V ± 0.2VDC ENVELOPE MAX. = 2Vp-p ± 0.2V
TEST	TP502 [H4], TP400 [F4], TP8 [E2]
MODE	STILL
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2(A/B GAIN BAL)[H1], VR500(ENV GAIN)[I4], VR501 (ENV OFFSET) [I4]

5000 SERIES

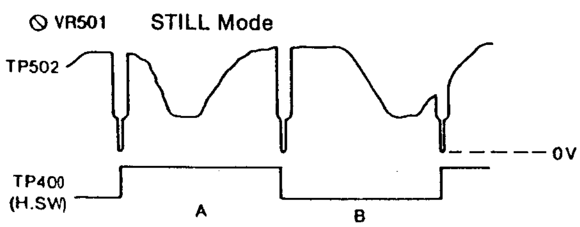
<STEP 1>
MENU CONDITION

TEST SERVO AT

Set the [PATTERN] to "FIX".

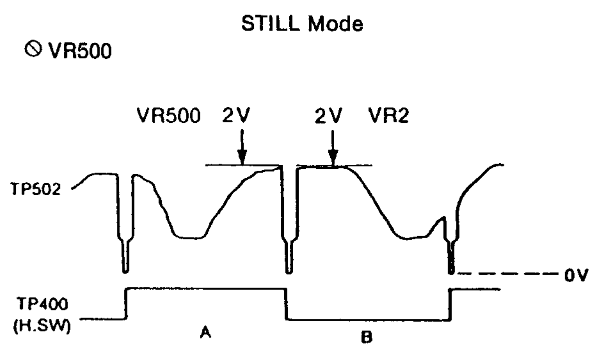
SEARCH = CENTER
PATTERN = FIX

<STEP 2>
1. SCOPE CH1 : TP502
   SCOPE CH2 : TP400
2. SCOPE SETTING : 1V/DC
   SCOPE CH2 : 5V
3. SCOPE MODE : CHOP
   BW
4. SCOPE TRIG : CH2
5. SCOPE SWEEP : 2ms
6. Place the unit in the STILL mode.
7. Adjust VR501 so that the minimum signal level is 0V ± 0.2V as shown in Figure.



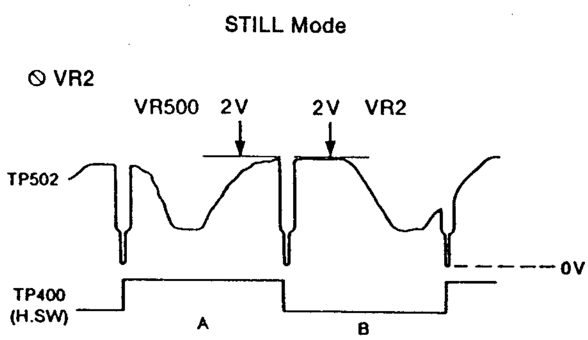
SPECIFICATION:
Envelope minimum DC level is 0V±0.2V DC.

<STEP 3>
1. SCOPE CH1 : TP502
   SCOPE CH2 : TP400
2. Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head Switch A portion.
3. Adjust VR500 (ENV GAIN) so that the maximum envelope level is 2V ± 0.2V.



SPECIFICATION:
Envelope Maximum=2V±0.2V (H SW A)

4. Rotate capstan shaft by hand (CCW) and set the Envelope becomes maximum during Head switch B portion.
5. Adjust VR2 (A/B GAIN BAL) so that the maximum envelope is 2V ± 0.2V.
6. After adjustment set the AT HEIGHT is 0.
7. After this adjustment, item 8-1 ENVELOPE DETECTION ADJUSTMENT is required.



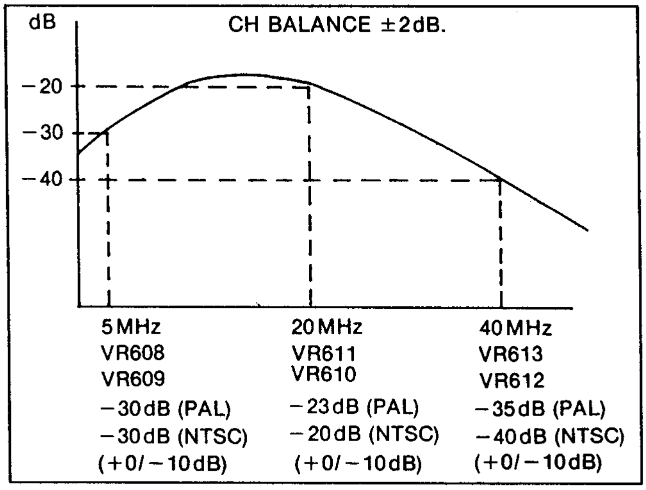
SPECIFICATION:
Envelope Maximum=2V±0.2V (Head SW B)

5-5. EQUALIZATION ADJUSTMENT (1) (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

Factory Preset only, skip this item after Head Replacement.

SPEC	
TEST	TP8[E2], VIDEO OUT, TP400[F4]
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	See Below

5000 SERIES



<STEP 1>
Adjustment VR.
(1) VR3 (PHASE SHIFT) -------6 division
(2) VR609 (MAG A) -------------7 division
VR608 (MAG B) -------------7 division
(3) VR613 (AFC HA) ------------5 division
VR612 (AFC HB) ------------5 division
(4) VR611 (AFC MA) ------------2 division
VR610 (AFC MB) ------------2 division

<STEP 2>
1. Set the spectrum analyzer to REG 4 mode.
REG 4 mode

ITEM PARAMETER

(1)	REF LEVEL-10.0dBm	
(2)	ATTEN	10dB
(3)	DIV (dB/DIV)	5dB/div
(4)	START FREQUENCY	0MHz
(5)	STOP FREQUENCY	50MHz
(6)	RES BW	1MHz
(7)	VIDEO BW	3kHz
(8)	SWEEP TIME	300msec
(9)	TRIGGER	EXT (HEAD SW)
(10)	VID AVG	10

<STEP 3>
EQUALIZER COARSE ADJUSTMENT
1. Connect the spectrum analyzer to TP8.
2. Connect the EXT Trigger input of the spectrum analyzer to TP400 (HEAD SW).
3. Adjust VR609 (MAG A) and VR608 (MAG B) so that the gain is -30dB +0/-10dB at 5MHz portion.
4. Adjust VR613 (AFC HA) and VR612 (AFC HB) so that the gain is -35dB +0/-10dB at 40MHz portion.
5. Adjust VR611 (AFC MA) and VR610 (AFC MB) so that the gain is -23dB +0/-10dB at 20MHz portion.

Note: If still out of specification.
Just adjust as A curve as shown in Figure.
And then carry on next the adjustment.

5-6. EQUALIZATION ADJUSTMENT (2) (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

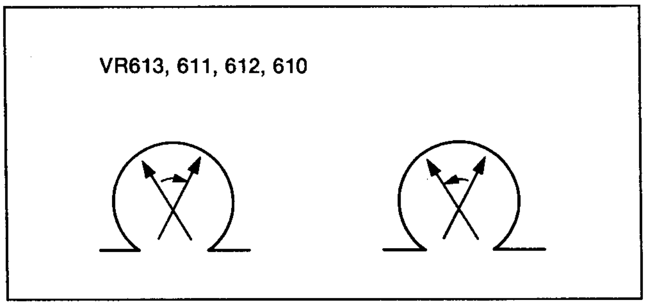
SPEC	MINIMUM ERROR RATE
TEST	TV MONITOR, FRONT ERROR DISPLAY
MODE	VAR (× 1)
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR611 (AFC MA)[F1], VR610 (AFC MB)[F1], VR613 (AFC HA)[E1], VR612 (AFC HB)[E1], VR10 (COMP BIAS LEVEL)[F1], VC301 (PHASE ADJ)[A2], VC1 (RESON A)[G2], VC2 (RESON B)[G2], VR3 (PHASE SHIFT)[I2] VR608(MAG B), VR609(MAG A)[D1], VR11 (AUTO EQ IN LEVEL)[E1] VR12 (AFC MATCH)[F4]

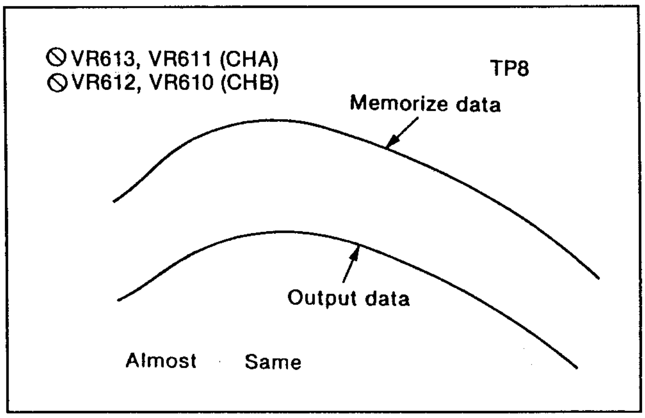
5000 SERIES

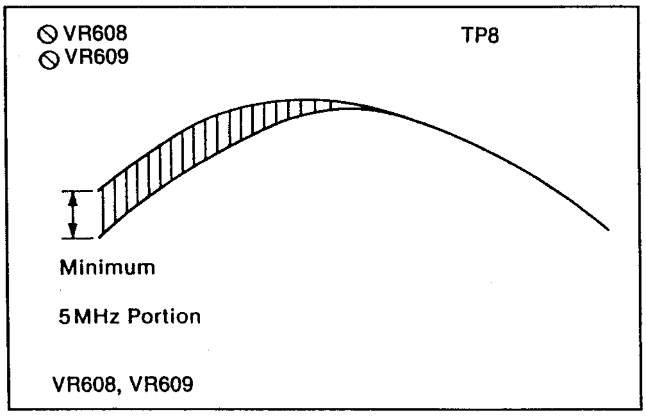
[RF SECTION]

<STEP 1>

1. Use the "75% Color Bars Shuffle OFF" tape.
2. Search = "CENTER"
   Maximize the envelope bar graphs on the front panel by adjusting the AT heights in the SUPER USER Menu.
3. Choose "PB mode : ch0" on the SUPER USER MENU when adjusting the Equalizer CH0 board, and "PB mode : ch1" for the CH1 board at the same time video output picture must be stable.
4. Center VC1/VC2.
5. Use VR3/VR10/VC301 to minimize errors (speckling) on the picture monitor. Continue adjusting these three pots until no further improvement is possible.
6. Use VC1, VC2 & VR3 to further reduce the errors.
7. Use VC1, VC2 & VR10 in the same manner.
8. Adjust VC301 to minimize screen errors and adjust VR12 to minimize screen errors.
9. Change the ECC Sample on the TEST/RF Menu to fast.
10. Memorize the spectrum waveform on TP8 into the "B" memory of the HP8591A Spectrum Analyzer.
11. Next adjust VR613 & 611 to reduce the error rate further. Turn VR613 very slightly in the direction which reduces the INNER ERROR RATE in the "CH0 A" bar graph. Then adjust VR611 very slightly in the opposite direction CCW to reduce the error further. Continue this alternate adjustment of the pots until no more improvement is possible.
12. Repeat this same adjustment technique starting with VR612 and following with VR610, in order to minimize the INNER ERROR RATE on the "CH0 B" bar graph.
13. Recall the previously memorized waveform in the Spectrum Analyzer "B" memory, and compare it to the waveform now present on TP8. If the two waveforms aren't similar in appearance, adjust the two pairs of pots 613/611 (CHA) & 612/610 (CHB) in the manner described above, for minimum error rate for both heads, and similar spectrum waveshapes.
14. Adjust VR608 & 609 to minimize the "sawtooth" appearance of the spectrum waveform at the 5Mhz end.
15. Adjust VR10 & VC301 to further reduce the Inner Error Rate.

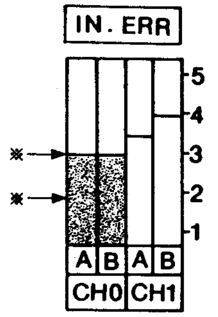






16. Confirm the error rate is less than 10-4 (scale 3).

⊘ CONFIRMATION



TYPICAL VALUE: Error rate is less than scale 3.

Note: After equalization adjustment, RF envelope output level adjustment is required as follows.

1. Connect the scope to TP8 and place the unit in PLAY mode.
2. Adjust VR608 and VR609 so that the output envelope is 400mVp-p. (50Ω terminated).
3. Connect the scope to WFM out and adjust VR11 so that the output envelope is 200mVp-p (75Ω terminated).

5-7. WFM OUT CONFIRMATION (S1 : REC/PLAY CH0) (S2 : REC/PLAY CH1)

SPEC	EYE : 200mV ± 50mV
TEST	WFM OUT
MODE	VAR X1
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR11 (AUTO EQ IN LEVEL)[E1],

5000 SERIES

<STEP 1>

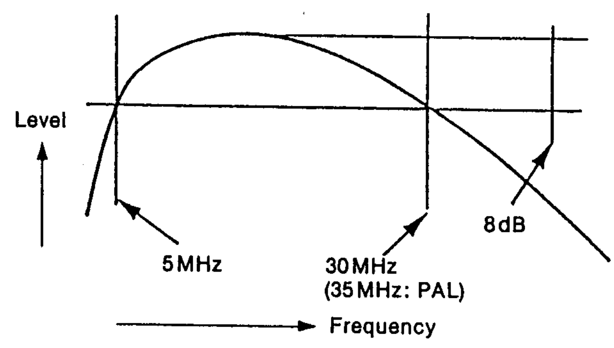
1. Connect the scope to VFM OUT on the rear panel through 75Ω termination.
2. Set the Front Menu to WFM ENV mode.
3. Confirm the ENVELOPE level is 900mV ± 200mV.
4. Set the Front Menu to WFM EYE mode.
5. Adjust VR11 (AUTO EQ IN LEVEL) so that the level is 200mV ± 50mV.

FINAL CONFIRMATION

SPEC	Refer to figure
TEST	TP8 [E2], TP400 [f4]
MODE	VAR × 1
TAPE	SHUFFLING OFF 75% COLOR BAR
M.EQ	SPECTRUM ANALYZER
INPUT	
ADJ.	VR3,VR610,VR611,VR612,VR613,VC1,VC2

1. Set the spectrum analyzer as shown in item 5-5.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP400.
4. Confirm that the output spectrum is as shown in figure.
5. If it is not, readjust VR3, VC1, VC2 (PHASE), VR610, VR612, VR611 and VR613 (LEVEL).

5MHz = 30MHz ± 2MHz (NTSC)
35MHz ± 2MHz (PAL)



7. CUE AUDIO (S3) BOARD MODE CONDITION

Set the Switches on the AUDIO IN.OUT P.C.B. and set the MENU condition.

INPUT ATT SELECT SW 0dBm
(on the AUDIO IN/OUT Board)
OUTPUT ATT SELECT SW 0dBm
(on the AUDIO IN/OUT Board)
INPUT IMPEDANCE SW .... HIGH
(on the AUDIO IN/OUT Board)
MENU CONDITION
AUDIO IN MENU
Select the CUE AUDIO LEVEL to "UNITY" : F5
AUDIO OUT MENU
Select the CUE AUDIO LEVEL to "UNITY" : F5

7-1. MASTER OSC DRIVE VOLTAGE ADJUSTMENT (S3 : CUE AUDIO)

SPEC	21V ± 0.1V DC
TEST	TP1[I5]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1 (21V ADJ.)[I4]

<STEP 1>
1. SCOPE : TP1
2. Place the unit in the RECPLAY mode.
3. Adjust VR1 so that the DC voltage is 21V ± 0.1V DC.

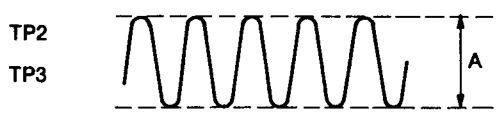
7-2. MASTER OSC ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP2 = 70kHz ± 0.2kHz, 5.5Vpp ± 1.0V TP3 = 5.5Vpp ± 1.0V
TEST	TP2[H2], TP3[G2]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	FREQUENCY COUNTER, OSCILLOSCOPE
INPUT	
ADJ.	T1[H2], T1 on S3 SUB2

<STEP 1>
1. FREQUENCY COUNTER : TP2
2. Place the unit in the RECPLAY mode.
3. Adjust T1 so that the OSC frequency is 70kHz ± 0.2kHz.

<STEP 2>
1. SCOPE CH1 : TP2
   CH2 : TP3
2. Place the unit in the RECPLAY mode.
3. Confirm that the OSC frequency level A is 5.5 ± 1.0Vp-p as shown in Figure.

⦸ CONFIRMATION



A=5.5Vp-p±1.0V

<STEP 3>
1. Scope CH1 : PIN 6 of S3 SUB2
2. Adjust T1 on S3 SUB2 so that the OSC level becomes maximum.

<STEP 4>
1. SCOPE CH1 : PIN 6 of S3 SUB2
   CH2 : PIN 7 of S3 SUB2
2. Confirm the OSC level is 5.5Vpp ± 1V.
3. Confirm the frequency is 140 kHz ± 5kHz.

7-3. FULL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

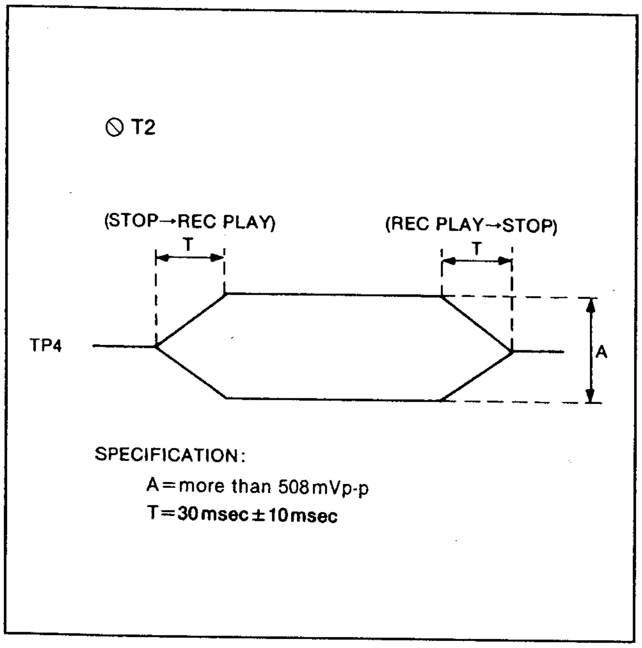
SPEC	TP4 : more than 508mVp-p, T = 30msec ± 10msec
TEST	TP4[H1]
MODE	RECPLAY, RECPLAY ↔ STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE (STORAGE)
INPUT	
ADJ.	T2[I1]

<STEP 1>

1. SCOPE : TP4
2. Place the unit in RECPLAY mode.
3. Adjust T2 so that the signal level A is maximum.
4. Confirm that level A is more than 508mVp-p.

<STEP 2>

1. Place the unit moving to RECPLAY from STOP mode and moving to STOP from RECPLAY mode.
2. Confirm that the rising and falling period of the waveform is 30ms ± 10ms as shown in Figure.



7-4. CUE ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

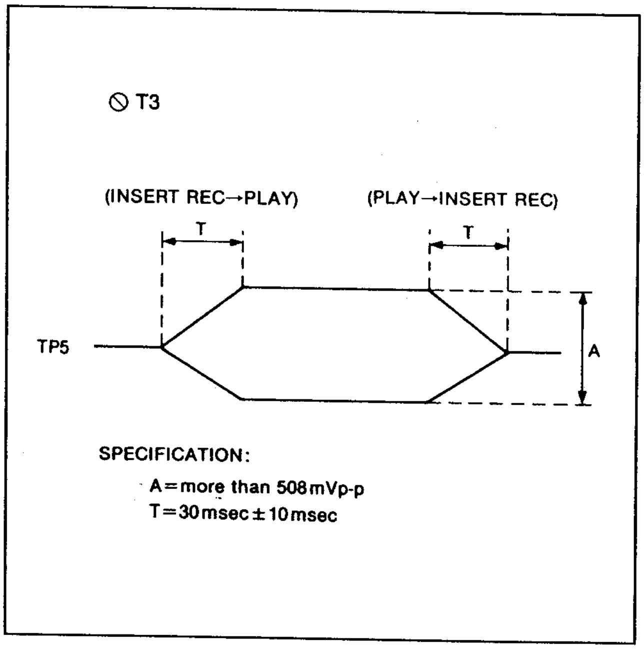
SPEC	TP5 : more than 508mVpp, T = 30msec ± 10msec
TEST	TP5[G2]
MODE	INSERT REC ↔ PLAY (CUE ON)
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T3[G1]

<STEP 1>

1. SCOPE : TP5
2. Place the unit in INSERT CUE REC mode.
3. Adjust T3 so that the signal level A is maximum.
4. Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 2>

1. Place the unit moving to INSERT REC from play and moving to play from INSERT REC mode.
2. Confirm that the rising and falling period of the waveform is 30ms ± 10ms as shown in Figure.



7-5. T/C ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

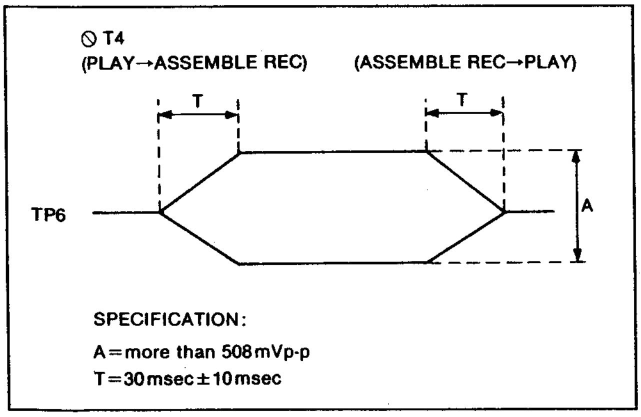
SPEC	TP6 : more than 508mVpp, T = 30msec ± 10msec
TEST	TP6 (T/C ERASE)[F2]
MODE	INSERT REC. ASSEMBLE REC ASSEMBLE REC ↔ PLAY
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T4 (T/C ERASE)[F1]

<STEP 1>
MENU CONDITION
MAN - EDIT MENU INSERT "ON"
Select the TC F10 to "ON".

<STEP 2>
1. SCOPE : TP6
2. Place the unit in INSERT REC mode.
3. Adjust T4 so that the signal level A is maximum.
4. Confirm that it level A is more than 508mVp-p as shown in Figure.

<STEP 3>
1. Place the unit in ASSEMBLE RECORDING mode.
2. Confirm that the signal level A is more than 508mVp-p.
3. If it is not, Adjust T4 so that the level A is more than 508mVp-p as shown in Figure.

<STEP 4>
1. Place the unit moving in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
2. Confirm that the rising and falling period of the waveform is 30msec ± 10msec as shown in Figure.



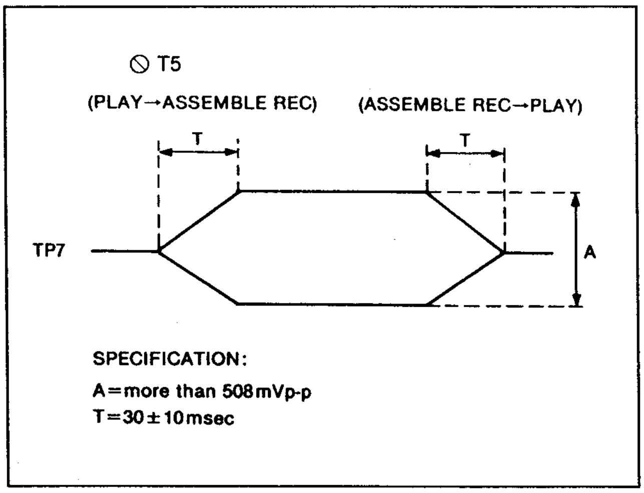
7-6. CTL ERASE CURRENT ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP7 = more than 508mVpp, T = 30msec ± 10msec
TEST	TP7[D2]
MODE	ASSEMBLE REC to PLAY, PLAY to ASSEMBLE REC
TAPE	PRE-RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	T5[D1]

<STEP 1>
MENU CONDITION
MAN - EDIT MENU ASSEMBLE
Select the TC F10 to "OFF". (CTL)

<STEP 2>
1. SCOPE : TP7
2. Place the unit in ASSEMBLE REC mode.
3. Adjust T5 so that the signal level A is maximum.
4. Confirm that level A is more than 508mVp-p as shown in Figure.

<STEP 3>
1. Place the unit in ASSEMBLE RECORDING mode from PLAYBACK mode and moving in PLAYBACK from ASSEMBLE RECORDING mode.
2. Confirm that the rising and falling period of the waveform is 30 ± 10msec as shown in Figure.



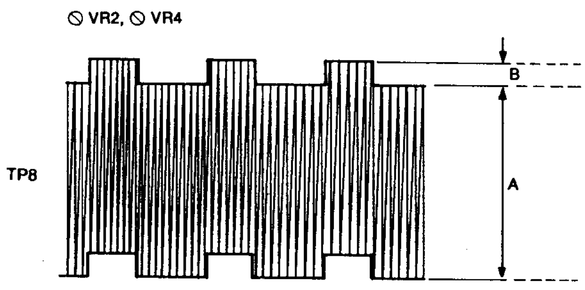
7-7. T/C BIAS & SIGNAL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP8 BIAS CURRENT A = 62mVpp ± 3mV SIGNAL CURRENT B = 5mVpp ± 0.2mV
TEST	TP8[I3], TP10[H4], TP11[I4]
MODE	ASSEMBLE REC
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE, PROBE 1:1
INPUT	
ADJ.	T6[I2], VR2 (T/C BIAS CURRENT)[I3] VR4 (T/C SIGNAL CURRENT)[G4]

<STEP 1>
MENU CONDITION
MAN - EDIT MENU ASSEMBLE
Select the TC F10 to "ON".

<STEP 2>
1. SCOPE : TP8
2. Place the unit in ASSEMBLE REC mode.
3. Adjust T6 so that the signal level A is maximum.

<STEP 3>
1. SCOPE : TP10, TP11 (probe GND)
2. Place the unit in ASSEMBLE REC mode.
3. Adjust VR2 so that the BIAS CURRENT LEVEL A is 62mVpp ± 3mV as shown in Figure.
4. Adjust VR4 so that the SIGNAL CURRENT LEVEL B is 5mVpp ± 0.2mV as shown in Figure.



SPECIFICATION:
⊘ VR2 BIAS CURRENT A=62mVp-p±3mV
⊘ VR4 SIGNAL CURRENT B=5mVp-p±0.2mV

7-8. CUE BIAS CURRENT ADJUSTMENT (1)(S3 : CUE AUDIO)

SPEC	TP9 : MAXIMUM, CUE OUT : MAXIMUM
TEST	TP9[F3], CUE OUT
MODE	REC PLAY, REC PLAY ↔ PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	1kHz 0dBm Sinewave signal to CUE IN
ADJ.	T7[F3], VR3 (CUE BIAS CURR.)[G3]

<STEP 1>
1. SCOPE : TP9
2. Place the unit in REC PLAY mode.
3. Adjust T7 so that the signal level is maximum.

T7 Signal Level = maximum

<STEP 2>
1. SCOPE : CUE OUT
2. Place the unit repeat moving in REC PLAY from PLAYBACK and in PLAYBACK from REC PLAY mode.
3. Adjust VR3 so that the signal level is maximum.

7-9. EE LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP13 : -12dBm ± 0.2dB, CUE OUT : 0dBu ± 0.2dB
TEST	TP13[B3], CUE OUT
MODE	
TAPE	VTVM
M.EQ	1kHz 0dBu Analog Sinewave signal to CUE IN
INPUT	VR6 (EE LEVEL)[B3], VR7 (EE OUT LEVEL)[A3]
ADJ.	

4000 SERIES

<STEP 1>
MACHINE CONDITION
IN/OUT ATT SW (on AUDIO IN/OUT P.C.B) : 0dBm
INPUT IMPEDANCE : HIGH
AUDIO IN MENU : UNITY

<STEP 2>
VTVM : TP13
Adjustment VR : VR6
SPECIFICATION : -12dBm ± 0.2dB

<STEP 3>
VTVM : CUE OUT
Adjustment : VR7
SPECIFICATION : 0dBu ± 0.2dB

7-10. PLAYBACK EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz ~ 1kHz = -3dB ~ +1.5dB
TEST	TP16 [C3]
MODE	PLAY
TAPE	AUDIO FREQUENCY RESPONSE
M.EQ	VTVM
INPUT	
ADJ.	VR10 (PB EQ)[C1]

<STEP 1>
1. VTVM : TP16
2. Play back the Alignment Tape.
3. Adjust VR10 so that the Playback level is within the specification as shown.

SPECIFICATION:
50Hz ~ 1kHz = -3dB ~ +1.5dB
1kHz ~ 15kHz = ± 1.0dB
(1kHz 0dB Reference)

7-11. PLAYBACK LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 = -12dB ± 0.2dB, CUE OUT : 0dBu ± 0.2dB
TEST	TP16[C3], CUE OUT
MODE	PLAY
TAPE	AUDIO LEVEL ALIGNMENT TAPE
M.EQ	VTVM
INPUT	
ADJ.	VR11 (PB LEVEL)[B2], VR12 (PB OUT LEVEL)[C3]

<MACHINE CONDITION>

1. Output ATT : 0dB
2. Audio out Cue : UNITY (MENU)

<STEP 1>

1. VTVM : TP16
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR11

SPECIFICATION : -12dBm ± 0.2dB

<STEP 2>

1. VTVM : CUE OUT
2. Playback the Audio Level Alignment Tape.
3. Adjustment VR : VR12

SPECIFICATION : 0dBu ± 0.2dB

7-12. CUE BIAS CURRENT ADJUSTMENT (2) (S3 : CUE AUDIO)

SPEC	TP16 : -12dBm ± 0.2dB CUE OUT AUDIO DISTORTION IS LESS THAN 3%
TEST	TP16[C3], CUE OUT
MODE	REC PLAY ↔ PLAY
TAPE	BLANK TAPE
M.EQ	VTVM DISTORTION METER
INPUT	1kHz 0dBm, 1kHz +12dBm
ADJ.	VR8[A2]

<STEP 1>

1. VTVM : TP16
2. Supply a 1kHz 0dBm sine wave signal to CUE IN and Record.
3. Playback a just recorded portion.
4. Adjust VR8 so that the CUE BIAS CURRENT LEVEL is -12dBm ± 0.2dB.

TP16
SPECIFICATION : VR8 : -12dBm ± 0.2dB

<STEP 2>

1. DISTORTION METER : CUE OUT
2. Supply a 1kHz +12dBm sinewave signal to CUE IN and Recorded.
3. Playback a just recorded portion.
4. Confirm that the distortion is less than 3%.
5. If it is not adjust VR3 as'follow as item 7-11. CUE BIAS CURRENT ADJUSTMENT (1) <STEP 2>.

CUE OUT
SPECIFICATION:
AUDIO DISTORTION : less than 3%

7-13. REC EQUALIZER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	50Hz ~ 1kHz = -3dB ~ +1.5dB 1kHz ~ 15kHz = 1.0dB (1kHz 0dB Reference)
TEST	CUE OUT
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	-10dBm 1kHz, SWEEP
ADJ.	VR14 (REC EQ 2)[B2], FL4[A2], VR9[A2]

<STEP 1>

1. VTVM : CUE OUT
2. Supply a difference frequency sinewave as shown below and record.
3. Playback a just recorded portion.
4. Adjust VR14, FL4 and VR9 so that the Playback level is within the specification.

INPUT LEVEL: -10dBm 1kHz (Reference)
-10dBm SWEEP as shown below

SPECIFICATION:
50Hz ~ 1kHz = -3dB ~ +1.5dB
1kHz ~ 15kHz = ± 1.0dB
(1kHz -10dBm Reference)

Adjustable frequency
VR14 and FL4 : 5kHz ~ 12.5kHz
VR9 : 12.5kHz ~ 15kHz

7-14. RECORDING LEVEL ADJUSTMENT (S3 : CUE AUDIO)

SPEC	TP16 : -12dBm ± 0.2dB
TEST	TP16[C3]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	VTVM
INPUT	1kHz 0dBmSinewave Signal to CUE IN
ADJ.	VR8[A2]

<STEP 1>

1. VTVM : TP16
2. Supply a 1kHz 0dBu sinewave signal to CUE IN and Record it.
3. Playback a just recorded portion.
4. Adjust VR8 so that the level is -12dBm ± 0.2dB.

SPECIFICATION : -12dBm ± 0.2dB

7-15. CUE METER ADJUSTMENT (S3 : CUE AUDIO)

SPEC	CUE METER -20dB
TEST	CUE METER
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 0dBm Signal to CUE IN
ADJ.	VR13[C4]

<STEP 1>

Note: Before this adjustment, CUE METER OFFSET (item 12-3) is required.

1. Supply a 1kHz 0dBu sinewave signal to CUE IN.
2. Adjust VR13 so that the meter level is -20dB.

7-16. CUE MIX ADJUSTMENT (S3 : CUE AUDIO)

SPEC	0dBm ± 0.5dBm
TEST	CUE OUT
MODE	EJECT
TAPE	
M.EQ	
INPUT	1kHz 0dBm Sinewave Signal to CUE IN
ADJ.	VR5[B4]

<STEP 1>

1. Supply a 1kHz 0dBu sinewave signal to CUE IN.
2. Set the VTR in to the CUE DMIX mode as shown below.

   AUDIO IN → SET UP → CH MIX ON → (CURSOR CENTER) → set the CH-1 S

3. Adjust VR5 so that the cue output level is 0dBm ± 0.5dBm.

8. AT (S4) BOARD MACHINE CONDITION

MACHINE CONDITION

1. Disconnect the P523 on the H.A. REGULATOR (S) P.C.B. which is located at right side of the Mechanism. while adjustment 8-1 through 8-6.
   Connect P523 from adjustment 8-7.

MENU CONDITION
TEST MENU
↓
AT SERVO TEST MENU

Set the each functions as follow.
1. F4: SEARCH = "CENTER"
2. F5: PATTERN = "ENABLE"
3. F8: AT HEIGHT = Ach "0"
   Bch "0"
4. SW2601 [D2] on S4 board is OPEN.
5. Error correction switches on L3 board are all OFF.
6. Error concealment switch on L4 board is OFF.

8-1. ENVELOPE DETECTION ADJUSTMENT (S4 : AT)

SPEC	0.7V ± 0.1VDC, PEAK = +3V ±0.1VDC
TEST	TP2611 (ENV CH1)[D1], TP2612 (ENV CH0)[D1]
MODE	STOP, EJECT, SW2601=OPEN, P523=OFF SEARCH = CENTER, PATTERN = ENEBLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2601[F2], VR2603[D4], VR2602[F2], VR2604[E4]

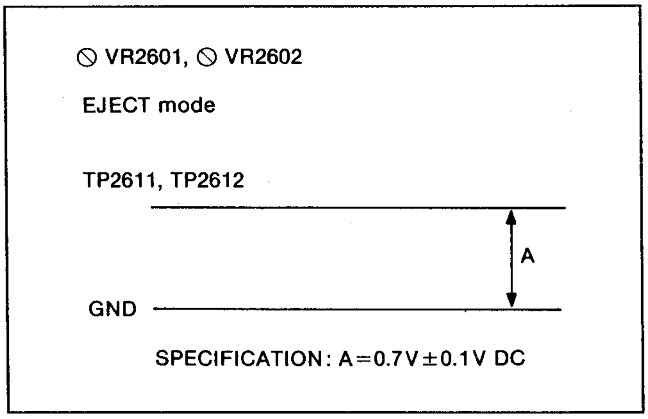
<STEP 1>

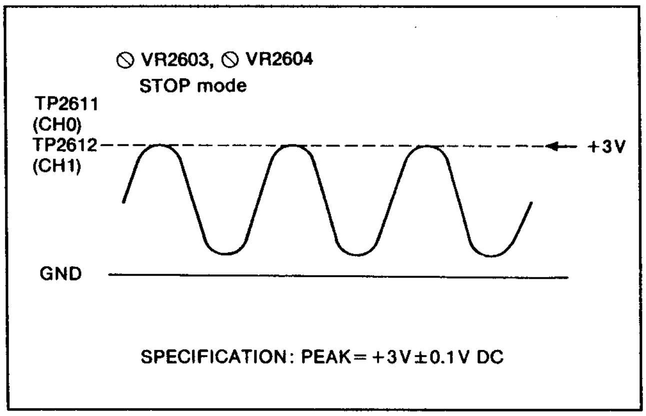
MENU CONDITION

Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. P523 = OFF

<STEP 2>
1. SCOPE : CH1 TP2611
   SCOPE : CH2 TP2612
2. Set the VTR in EJECT mode.
3. Adjust VR2601 and VR2602 so that the level of waveform is 0.7V ± 0.1 V DC.

<STEP 3>
1. SCOPE : CH1 TP2611
   SCOPE : CH2 TP2612
2. Set the VTR in STOP mode.
3. Rotate the capstan shaft by hand, and set the waveform peak becomes maximum.
4. Adjust VR2603 and VR2604 so that the level of waveform is 3V ± 0.1V DC.
5. Note that VR2601/VR2602/VR2603/VR2604 effect each other.
   Repeat step 2 and 3 and confirm that each adjustment is in specification.





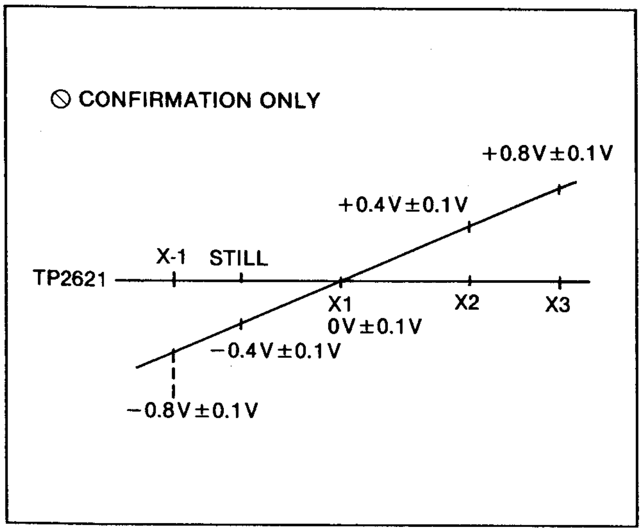
8-2. CONFIRMATION OF GROUP DELAY COMPENSATION CIRCUIT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2621 [H3]
MODE	VAR (X-1, STILL, X1, X2, X3), SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>
MACHINE CONDITION
Refer to the Machine condition and Menu condition at the beginning of this section.

<STEP 2>
Connect the scope to TP2621

<STEP 3>
Set the VTR VAR X-1, STILL, X1, X2 and X3 and confirm the each DC voltage is shown below.



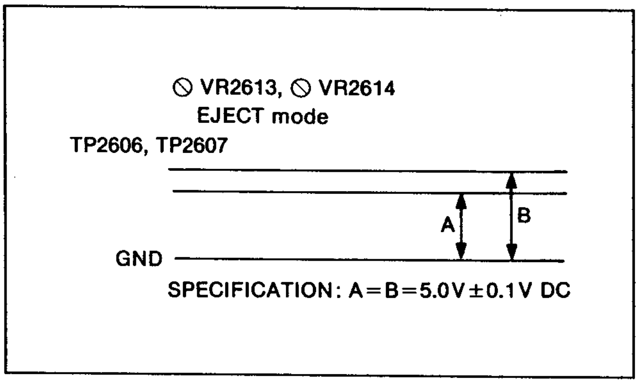
<STEP 4>
The DC level of VAR X3 mode should be stable more than 20 sec.

8-3. D/A CONVERTER FULL SCALE ADJUSTMENT (S4 : AT)

SPEC	5.0V ± 0.1VDC
TEST	TP2606 [B1], TP2607 [B2]
MODE	EJECT SW2601-OPEN, P523-OFF, SEARCH-CENTER, PATTERN-FIX
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2613 (DA1FS)[B2], VR2614 (DA2FS)[B2]

<STEP 1>
MACHINE CONDITION
1. Set the VTR in EJECT mode.
2. Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.

<STEP 2>
1. SCOPE CH1 : TP2606
   SCOPE CH2 : TP2607
2. Adjust VR2613 and VR2614 so that the voltage at TP2606 and TP2607 are +5V ± 0.1V DC.
3. Adjust VR2613 and VR2614 so that the difference voltage between TP2606 and TP2607 are within 0.05V. If the both voltage at TP2606 and TP2607 are 5.0V DC, then it is OK. If the one of the voltage is 4.9V adjust the other level is same level.
4. Note that the VR2613 and VR2614 effect each other.



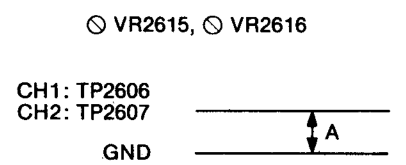
8-4. D/A CONVERTER OFFSET ADJUSTMENT (S4 : AT)

SPEC	TP2606 - TP2607 = 0V ± 0.05V DC
TEST	TP2606[B1], TP2607[B2], TP2623[D1], TP2624[E1], TP2619[E1] ... TRIGGER
MODE	VAR X1, SW2601 = OPEN, P523 = OFF SEARCH = CENTER, PATTERN = FIX
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2615 (DA10S)[B2], VR2616 (DA20S)[B2]

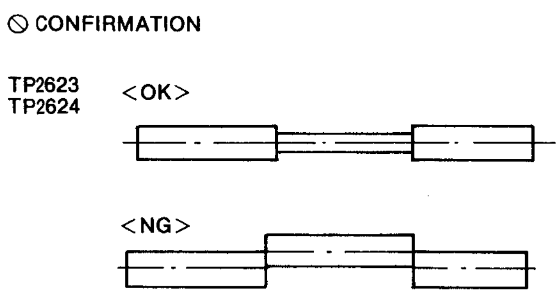
<STEP 1>
MACHINE CONDITION
1. Set the AT mode to SEARCH = CENTER and PATTERN = FIX in the AT TEST Menu.
2. Set the VTR in VAR X1 mode.

<STEP 2>
1. SCOPE CH1 : TP2606
   CH2 : TP2607
2. Adjust VR2615 and VR2616 so that their voltage are 0V ± 0.05V DC.

<STEP 3>
1. SCOPE CH1 : TP2623
   CH2 : TP2624
2. Confirm the waveform center is flat.



SPECIFICATION: A=0V±0.05V DC



8-5. OPEN GAIN ADJUSTMENT (S4 : AT)

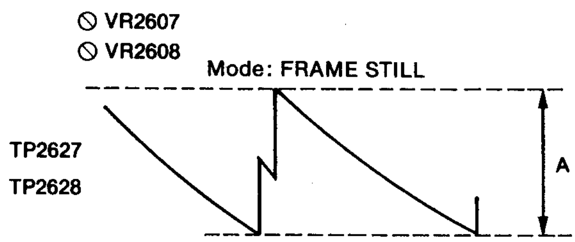
SPEC	TP2627 - TP2628 = 4.0Vpp ± 0.2Vp-p
TEST	TP2627[I1], TP2628[I1]
MODE	VAR, SPEED : FRAME STILL, SW2601 = OPEN, P523 = OFF STRN = OPEN, SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2607[F1], VR2608[G1]

<STEP 1>
MACHINE CONDITION

<STEP 2>
MENU CONDITION
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION.

<STEP 3>
1. SCOPE : TP2627
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2607 so that the waveform level A is 4.0Vpp ± 0.2Vp-p as shown in Figure.

<STEP 4>
1. SCOPE : TP2628
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2608 so that the waveform level A is 4.0Vpp ± 0.2Vp-p as shown in Figure.



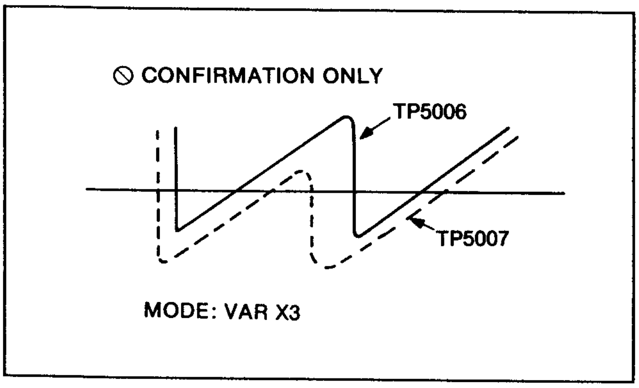
SPECIFICATION: A=3.3Vp-p±0.2Vp-p (NTSC)
A=4.0Vp-p±0.2Vp-p (PAL)

8-6. DRIVE WAVEFORM CONFIRMATION (S4 : AT)

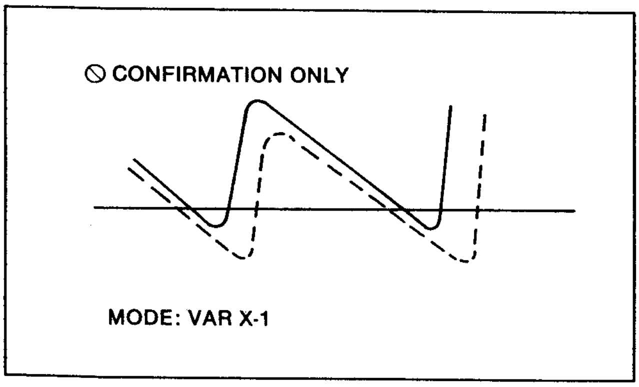
SPEC	REFER TO FIGURE
TEST	TP5006, TP5007 (HEAD AMP REGURATOR BOARD)
MODE	VAR X3,VAR X-1,SW2601=OPEN,P523=OFF SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>
MACHINE CONDITION
Set the Machine condition as shown in the first page of this section.

<STEP 2>
1. SCOPE CH1 : TP5006
   CH2 : TP5007 on H.A.REGURATOR BOARD
   The H.A.REGURATOR BOARD is located at right side of mechanism.
2. Set the VTR in VAR X3 mode and confirm the drive voltage is as shown below.



3. Set the VTR in VAR X-1 mode and confirm the drive voltage is as shown below.



4. Turns power off and connect P523.

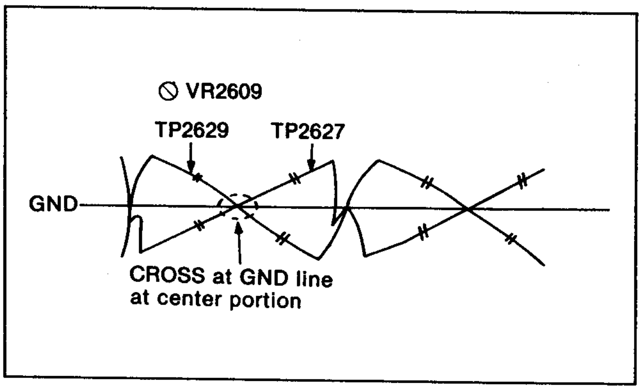
8-7. STRAIN SENSOR OUTPUT ADJUSTMENT (A CH) (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2627[I1], TP2629[G1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL,SW2601=OPEN,P523=ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2609 (STR OS A)[G1]

<STEP 1>
1. Confirm the P523 is connected.
2. Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>
1. Press VAR button and set the speed to STILL (FIELD STILL).
2. SCOPE CH1 : TP2627
   CH2 : TP2629
   TRIGGER : TP2619

<STEP 3>
1. Rotate the capstan shaft by hand and set the waveform of TP2627 crosses to GND at center of the slope.
2. Adjust VR2609 so that the TP2629 and TP2627 waveform crosses to GND at their center of the waveform.



8-8. STRAIN SENSOR OUTPUT ADJUSTMENT (B CH) (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2628[I1], TP2630[H1] TP2619[E1] ... TRIGGER
MODE	VAR FIELD STILL,SW2601=OPEN,P523=ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE (DC mode)
INPUT	
ADJ.	VR2610 (STR OS B)[H1]

<STEP 1>

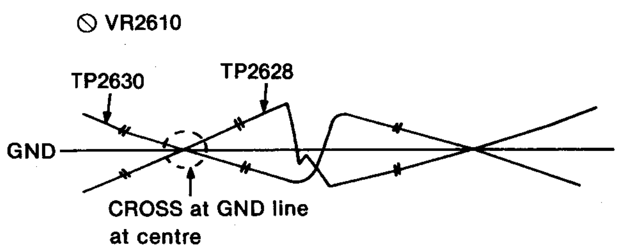
1. Confirm the P523 is connected.
2. Set the AT mode SEARCH = CENTER and PATTERN = ENEBLE by AT TEST Menu.

<STEP 2>

1. Press VAR button and set the speed to STILL (FIELD STILL).
2. SCOPE CH1 : TP2628
   CH2 : TP2630
   TRIGGER : TP2619

<STEP 3>

1. Rotate the capstan shaft by hand and set the waveform of TP2628 crosses to GND at center of the slope.
2. Adjust VR2610 so that the TP2630 and TP2628 waveform crosses to GND at their center of the waveform.



8-9. STRAIN SENSOR GAIN ADJUSTMENT (S4 : AT)

SPEC	TP2630 = TP2629 = 4.0Vpp ± 0.5V
TEST	TP2629[G1], TP2630[H1]
MODE	JOG, SPEED : FRAME STILL, SW2601 = OPEN, P523 = ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[G1]

Connect P523

<STEP 1>

MENU CONDITION

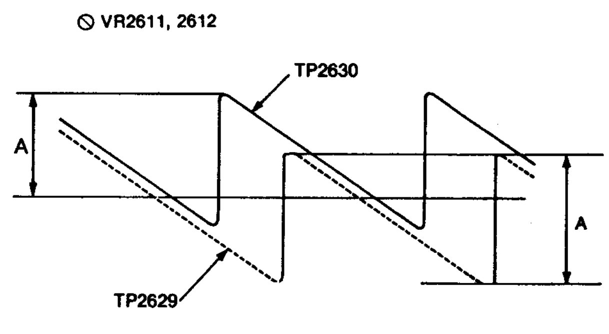
Refer to the Machine Condition and Menu Condition at the beginning of this SECTION. Do not remove P523.

<STEP 2>

1. SCOPE : TP2629
2. Playback a 75% color bar portion of the Alignment Tape in FRAME STILL mode.
3. Adjust VR2611 so that the waveform level A is 4.0Vpp ± 0.5V as shown in Figure.

<STEP 3>

1. SCOPE : TP2630
2. Playback a 75% color bar portion of the Alignment Tape on FRAME STILL mode.
3. Adjust VR2612 so that the waveform level A is 4.0Vpp ± 0.5V as shown in Figure.



SPECIFICATION: A=3.3Vp-p±0.5V (NTSC)
A=4.0Vp-p±0.5V (PAL)

8-10. AT HEIGHT (1) ADJUSTMENT (S4 : AT)

SPEC	TP2619 PULSE IS LOCATED AS SHOWN IN FIGURE
TEST	TP2610[F1], TP2619[F1], TP5006[C2], TP5007 (H.A REGULATOR S)[C1] TP2606, TP2607
MODE	VAR×1, SW2601=OPEN, P523-ON, SEARCH=CENTER, PATTERN=ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2605[F1], VR2606[F1]

<STEP 1>

SCOPE CH1 : TP2610 Segment Pattern
SCOPE CH2 : TP2619 Pulse
SCOPE CH3 : TP5006 Drive Voltage
SCOPE CH4 : TP5007 Drive Voltage

<STEP 2>

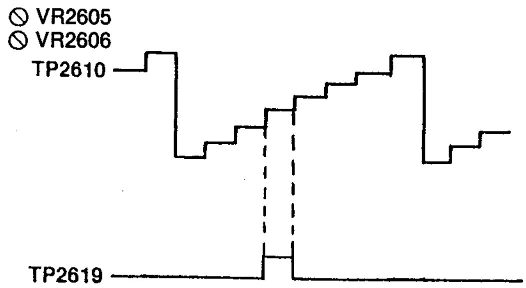
1. Field or Frame Still Option (Setup/Home/AT Play)
2. Center/Enable (Test/Servo/AT)
3. SW2601 open
4. Variable X1 Playback
5. 75% Color Bar Alignment tape, shuffling ON
6. Zero the AT Head Heights from the front panel. (Height ON/ BS with F9/left & right cursors, with the front panel knob).

<STEP 3>

1. Initially, adjust the deflection pattern voltages at TP5006 & 5007 are 0 volts DC by VR2605 & VR2606 during VAR X1 playback. This centers the AT heads.
2. Next, fine adjust these pots to achieve three conditions
   A). Proper rising stairstep and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the highest step.
   B). Maximum RF on the 4 "Envelope" bar graphs on the Test/Servo/AT screen.
   C). The segment LED D609 on the AT board should be off.
3. The drive voltage at TP5006 & 5007 will have changed, but they should still be within the range of zero volts, plus or minus fifty volts.
4. Note the voltages at TP5006 & 5007 for use in subsequent adjustments.

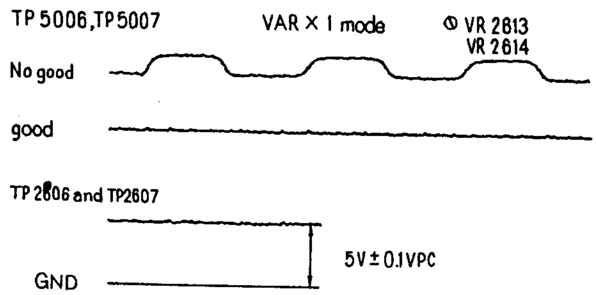
Note:

1. In this adjustment if output drive voltage waveforms (TP5006 and TP5007) are not flat like a pulse. VR2613 and VR2614 adjustments are required as shown in Figure.



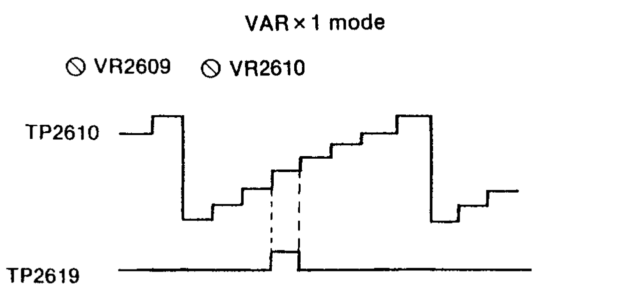
SPECIFICATION: TP2619 pulse is located at the fourth step of TP2610

2. Place the unit in VAR × 1 mode.
3. Adjust VR2613 and VR2614 so that the output waveform are flat as shown in Figure.
4. Confirm that the voltage at TP2606 and TP2607 are +5V ± 0.1VDC. (8-3. D/A CONVERTER FULL SCALE ADJUSTMENT)



8-11. AT HEIGHT (2) ADJUSTMENT (S4 : AT)

SPEC	TP2619 PULSE IS LOCATED AT PEAK OF TP2610
TEST	TP2610[F1],TP2619(TRIGGER)[E1], TP5006[C2],TP5007(H.A REGULATOR S)[C1] TP2629,TP2630
MODE	VAR, SW2601-CLOSE, P523-ON, SEARCH = CENTER,PATTERN= ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609(STR OS A)[G1], VR2610(STR OS



SPECIFICATION: TP2619 pulse is located at the fourth step of TP2610

This adjustment will be done in the open loop and closed loop modes.

<STEP 1>

OPEN LOOP MODE

1. 75% color bar alignment tape
2. SW2601 OPEN
3. AT menu Screen Options; CENTER/ENABLE
4. Variable X1 playback

<STEP 2>

1. SCOPE CH1 : TP2629
   SCOPE CH2 : TP2630
   (Strain Offset pots)
   VR2609
   VR2610
   (Strain Offset pots)

<STEP 3>

1. Adjust VR2609 &2610 ("STROSA" & "STROSB") for 0 volts at TP2629 & 2630.

CLOSED LOOP MODE

<STEP 4>

1. Close the strain loop with SW2601.
2. Continue in Variable X1 playback.
3. While monitoring TP5006 & 5007, adjust the Strain Offsets VR2609 & 2610 for the voltages noted at in step (8-10).

<STEP 5>

1. Now, fine adjust VR2609 & 2610 for three conditions;
   A). Proper rising stairstep and pulse timing at TP2610 & 2619. (The stairs are rising from left to right, there are 6 or 8 steps (for NTSC or PAL), and the pulse is aligned with the fourth step.
   B). Maximum RF on the 4 "envelope" bar graphs on the Test/Servo/AT screen.
   C). Zero volts plus or minus 50 volts at test points 5006 & 5007.

<STEP 6>

Repeat section 8-10, 8-11 until front panel envelope does not change when SW2601 is opened and closed.

8-12. GAIN ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619(TRIGGER)[E1], TP5006[C2], TP5007[C1], TP8(S1), TP8(S2), TP207 on REC Amp
MODE	VAR×1, FRAME STILL, SW2601 - CLOSE, H.A REGULATOR, P523 - ON, SEARCH - CENTER, PATTERN - ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2611[G1], VR2612[H1]

<STEP 1>

1. AT Play "Frame" option on the SET UP/HOME screen or TEST/SERVO/AT screen.
2. CENTER/ENABLE on the Test/Servo/AT screen.
3. Color bar tape.
4. Place the unit to STILL mode.
5. Set the AT head heights to zero from the front panel.

<STEP 2>

1. SCOPE CH1 : TP2610 Segment Pattern
   SCOPE CH2 : TP2619 Pulse
   VR2611 "STRGNA"
   VR2612 "STRGNB"

<STEP 3>

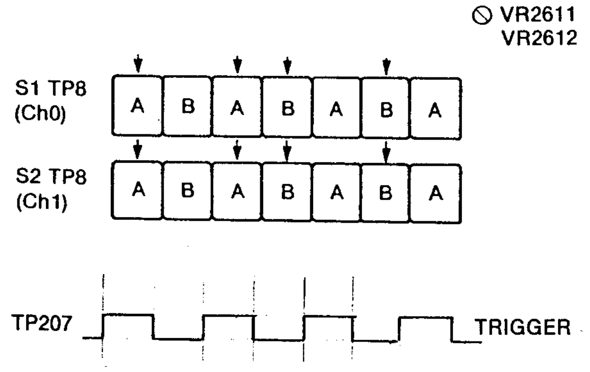
1. Adjust VR2611 & 2612 for Maximum RF level on the "envelope" bar graphs on the front panel while maintaining the proper timing relationship between the pulse and Segment waveforms, at the fourth step.
2. As a rough check, the voltage in the play mode should be approximately 0 volts at TP5006 & 5007, and the segment LED should be off.

<STEP 4>

1. Next, fine adjust the circuit as follows;
2. AT Play "Frame" on the SETUP/HOME screen or TEST/SERVO/AT screen.
3. CLOSE/CENTER/ENABLE
4. SW2601 CLOSED
5. Variable STILL mode (not play Still).

<STEP 5>

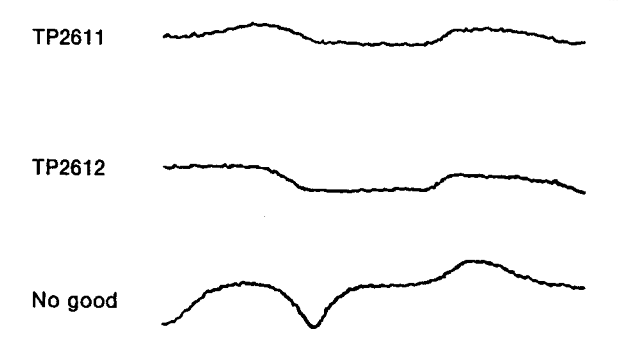
1. SCOPE CH1 : TP8 on the S1 board
   SCOPE CH2 : TP8 on the S2 board
   TP207 for triggering
   (on the REC Amp Board).
2. Fine adjust VR2611 & 2612 for flatness in the detected envelope, and maximum envelope level on the front panel meter.



SPEC=TP8 are flat

Note:

1. If output waveform of TP8 is not clear, connect the scope to CH1 to TP2611 and CH2 to TP2612 on the AT board.
2. Confirm that output DC level is flat.



8-13. STRAIN LOOP FREQUENCY RESPONSE ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2629[G1] --- A CH WFM OUT TP2630[H1] --- B CH (ENVELOPE) TP2619[E1] --- (H SW) TRIGGER,
MODE	VAR X1, -X1, SW2601=CLOSE, SEARCH=CENTER=PATTERN=ENABLE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	Composite color bar to VIDEO IN
ADJ.	VR2619(TWN A)[H2], VR2621(LGN A)[H2] - A CH VR2620(TWN B)[H2], VR2622(LGN B)[H2] - B CH

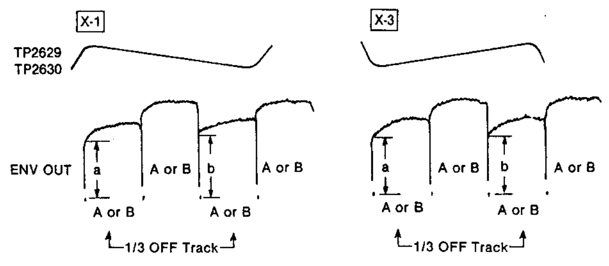
<STEP 1>
1. SCOPE CH1 : WFM OUT (ENV pattern)
   CH2 : TP2619 (TRIG)
2. Set the each VRS as follows.
   VR2619, VR2620 : center position.
   VR2621, VR2622 : fully counterclockwise

<STEP 2>
1. Place the unit to VAR ×1 mode.
2. Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
3. Slowly turn VR2619 and VR2620 to clockwise until output envelope waving is increase.
4. Adjust VR2619 and VR2620 to counterclockwise so that the output envelope waving is minimum.
5. Confirm that the SEGM lamp is OFF.
6. After confirmation, set the AT HEIGHT to 0.
7. Set the VR2621 and VR2622 to fully clockwise.

Note: Adjust each head (A, B) independently.

<STEP 3>
1. Scope CH1 : WFM OUT (ENV pattern)
   CH2 : TP2629, TP2630
   CH3 : TP2619 (TRIG)
2. Place the unit to VAR-X1 and VAR-X3.

<STEP 4>
1. Set the AT height on the test menu to 1/3 level decrease (off track) from maximum envelope.
2. Adjust VR2621 and VR2622 so that the droop of entrance side of output envelope is same level between a and b.



<STEP 5>
1. Confirm that the SEGM lamp is OFF.
2. After confirmation, set the AT HEIGHT to 0.

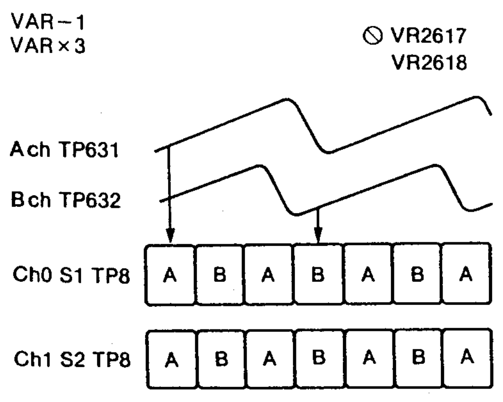
Note: Adjust each head (A, B) independently.

8-14. GROUP DELAY COMPENSATION ADJUSTMENT (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP8[E2]→S1, TP8[E2]→S2, TP631[H2]→S4 TP632[I3] → S4
MODE	VAR × -1, × 3 → VAR ×1 ~ ×-3
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2617[D1], VR2618[E1]

<STEP 1>

1. AT Play Frame or Field.
2. SCOPE CH1 : TP8 on the S1 board.
   SCOPE CH2 : TP8 on the S2 board.
   SCOPE CH3 : TP2631
   SCOPE CH4 : TP2632
3. Use the knob to activate the variable times 3 and variable times -1 modes, alternately.



SPEC=Center position between (1) and (2)

4. Confirm that the output waveform is flat as shown in figure.
5. If it is not, adjust VR2617 and VR2618.

8-15. PRE READ CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	EDIT PLAY, SW2601-CLOSE, P523-ON AT TEST = NORMAL, PRE READ MODE
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

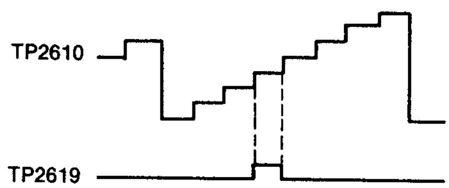
<STEP 1>
SCOPE CH1 : TP2610
SCOPE CH2 : TP2619

<STEP 2>

1. Set preread mode as follows.

   HOME MENU → F + F8 (PRE READ ON) → MANUAL EDIT MENU → F12 INSERT
2. Playback the alignment tape.

<STEP 3>
Confirm the pulse at TP2619 is located at 4TH (PAL), 3RD (NTSC) steps of TP2610 as shown below.

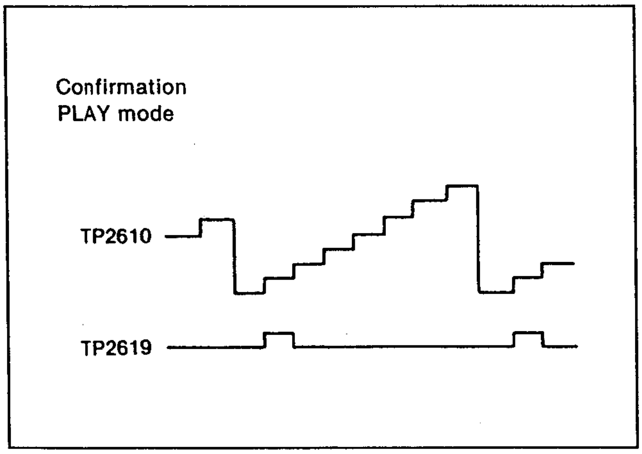


8-16. CONFIDENCE PB CONFIRMATION (S4 : AT)

SPEC	REFER TO FIGURE
TEST	TP2610[F1], TP2619[E1]
MODE	CONFIDENCE PB HOME MODE, SW2601=CLOSE
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	CONFIRMATION ONLY

<STEP 1>
SCOPE CH1 : TP2610
SCOPE CH2 : TP2619

<STEP 2>
Confirm the pulse at TP2619 is located at Second steps of TP2610 as shown below.

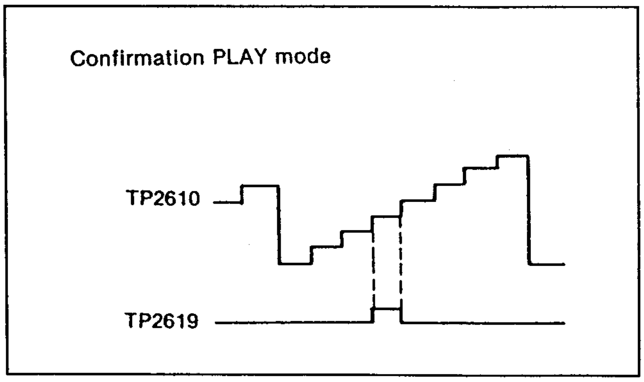


FINAL CONFIRMATION OF AT ADJUSTMNET

SPEC	TP2619 PULSE IS LOCATED AS SHWON IN FIGURE
TEST	TP2611[D1], TP2612[D1], TP2610[F1], TP2619(TRIGGER)[E1], TP5006, TP5007 (H.A REGULATOR)
MODE	VAR, FRAME STILL, SW2601 = CLOSE, P523 = ON SEARCH = CENTER, PATTERN = ENABLE
TAPE	75% COLOR BAR POSITION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR2609 (STR OS A),VR2610 (STR OS B)[H1] VR2611[G1], VR2612[H1]

<STEP 1>
MACHINE CONDITION
1. VAR X1, P523 = ON, SW2601 = CLOSE
2. Set the AT mode, SEARCH = CENTER, PATTERN = ENABLE
3. Set the AT HEIGHT on the front panel, both A CH and B CH are 0.

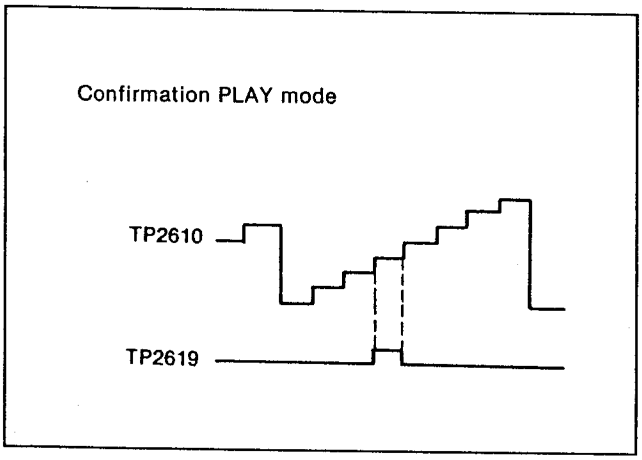
<STEP 2>
1. SCOPE CH1 : TP2610
   CH2 : TP2619
   CH3 : TP5006
   (H.A REGULATOR Board)
   CH4 : TP5007
   (H.A REGULRATOR Board)
2. Confirm the waveform is as shown in Figure. If it is not, adjust VR2609 and VR2610.
3. Confirm that the DC voltage is 0 ± 50V DC.
4. Confirm that the envelope output is maximum on the front display.
5. If it is not Readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) ADJUSTMENT)



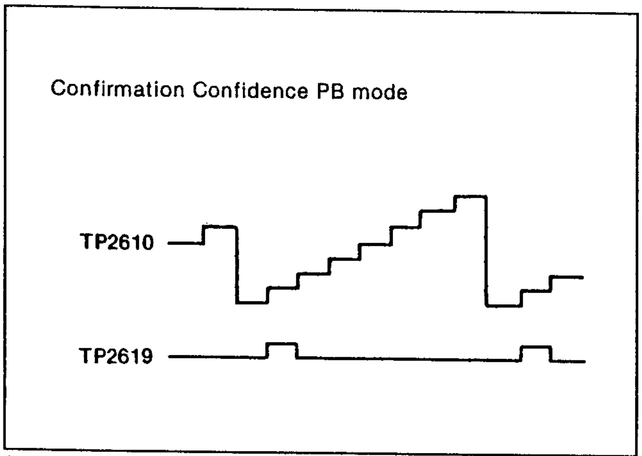
<STEP 3>

1. Set the AT mode to NORMAL (F1).
2. Place the unit in the PLAY mode.
3. Confirm the waveform is as shown in figure.

<STEP 4>



1. Place the unit in the Recording mode.
2. Confirm the waveform is as shown in figure.



3. If it is not, readjust VR2609 and VR2610. (Refer to item 8-11 AT HEIGHT (2) adjustment)

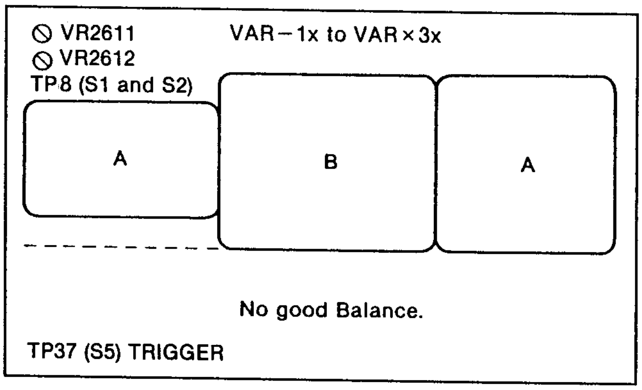
NOTE: If the segment steps is mached the pulse and segment, Segment LED is OFF.

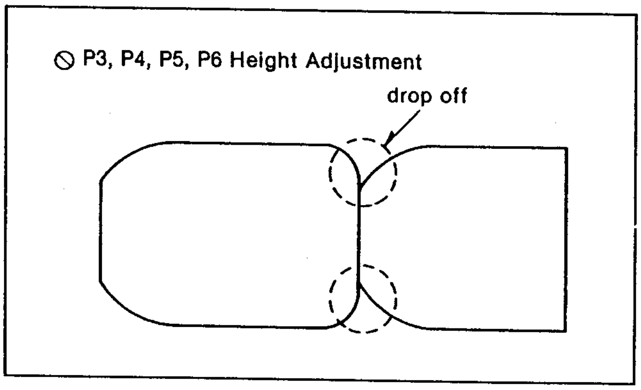
<STEP 5>

1. SCOPE CH1 : TP8 (S1) on the Equalizer Board.
   CH2 : TP8 (S2) on the Equalizer Board.
   CH3 : TP37 (S5) on the SERVO Board. (for trigger)
2. Confirm that the envelope is flat from VAR X-1 to VAR X3. And check the CH A and CH B envelope output balance.

Note: If the envelope drop off at entrance side and exit side, in this case re-check the tape pass linearity. (Refer to P3 or P6 Height adjustment)

3. If it is not, readjust VR2611 and VR2612. (Refer to item 8-15 GAIN adjustment)





9. SERVO (S5) BOARD

9-1. CAPSTAN FG AMP ADJUSTMENT (S5 : SERVO)

SPEC	FG DC BIAS = 6.0V ± 0.2V DC
TEST	P2210-14C[D5], P2210-16C[D5], TP14[F4], TP17[C4]
MODE	EE1 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE DC mode
INPUT	
ADJ.	VR1[I4], VR2[I4]

<STEP 1>

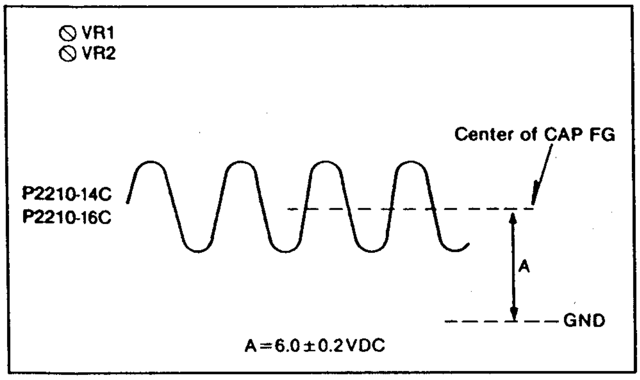
1. SCOPE : P2210-14C
2. Turn the capstan Motor by hand.
3. Adjust VR1 so that the center of CAP FG level A is 6.0V ± 0.2V DC as shown in Figure.

<STEP 2>

1. SCOPE : P2210-16C
2. Turn the capstan Motor by hand.
3. Adjust VR2 so that the center of CAP FG level A is 6.0V ± 0.2V DC as shown in Figure.

<STEP 3>

1. SCOPE CH1 : TP14
   CH2 : TP17
2. Turn the capstan Motor by hand.
3. Confirm that the pulse is appeard on the scope.



9-2. TAKE UP REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	T REEL TORQUE = 53gr.cm ± 5gr.cm
TEST	TAKE UP REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENTELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torquen Gauge and set the Dial Torque Gauge on the Gake Up Reel Motor.
4. Set the VTR into test mode.

   TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

   TEST → SERVO → REEL → F+F3

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

   SPECIFICATION = 5.gr.cm ± 5gr.cm

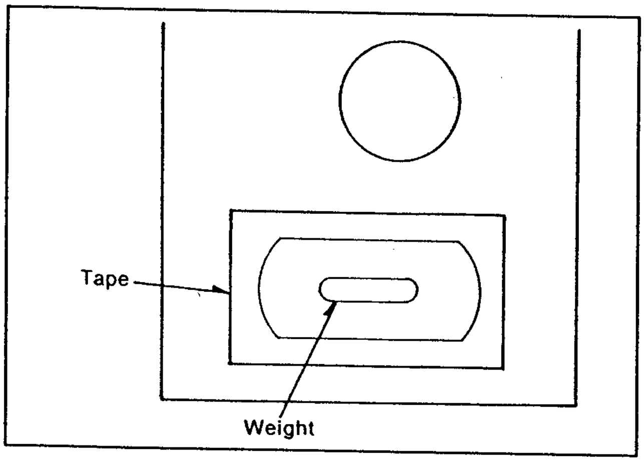
<STEP 2>

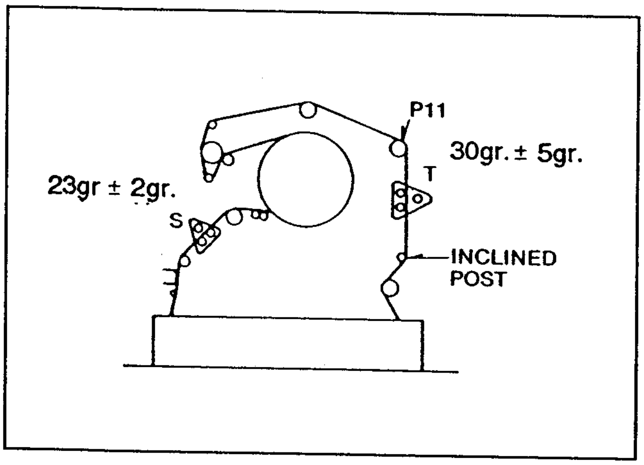
1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Take up Reel Torque so that the tension is within specification.

   SPECIFICATION : 30gr.cm ± 5gr.cm

SPEC	1	2	3	4	5	6
Factory Set	ON	ON	OFF	OFF	OFF	ON
Service Mode	ON	ON	OFF	ON	OFF	ON

Service Switch





9-3. SUPPLY REEL TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	S REEL TORQUE = 45gr.cm ± 5gr.cm
TEST	SUPPLY REEL
MODE	TAPE LOADING COMPLETION WITHOUT CASSETTE TEST MECH, NO FRLD
TAPE	SELF-RECORDING TAPE
M.EQ	DIAL TORQUE GAUGE(150g max.) --- VFK71 DIAL TORQUE GAUGE ADAPTOR--VFK0134 TENTELO METER --- VFK0132
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque gauge, on the supply Reel Motor.
4. Set the VTR into Test mode.

   TEST → SERVO → REEL → MEASURE → S.T

5. Place the unit in the STOP mode.
6. Place the unit into the Supply Reel Torque adjustment mode as shown below.

   TEST → F8(SERVO) → F2(REEL) → F+F2(SREEL)

7. Adjust Front Panel adjustment VR so that the Supply Reel Torque is within specification.

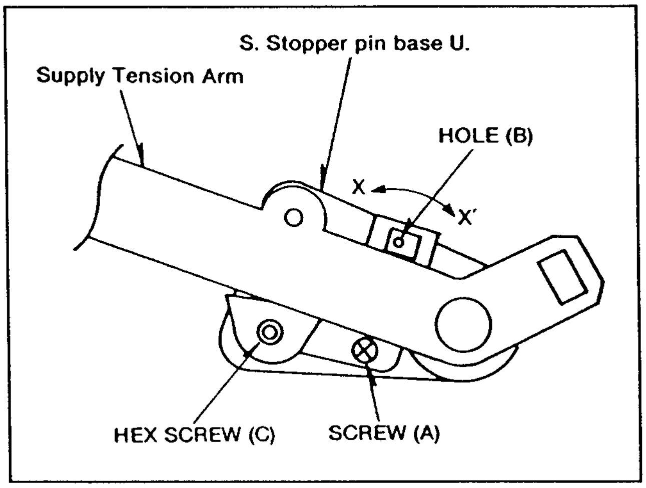
   SPECIFICATION = 45gr.cm ± 5gr.cm

<STEP 2>

1. Insert a self recording tape.
2. Set the VTR into recording mode.
3. Adjust Supply Reel Torque so that the tension is within specification.

   SPECIFICATION : 23gr.cm ± 2gr.cm (P2~P3)

4. If it is not within specification, loowen the screw (A).
5. Insert the Eccentric Screwdriver into Hole (B).
6. Adjust the position of S. Stopper Pin Base Unit so that the supply tension is 18gr.cm ~ 28gr.cm.
7. Insert the Hex Wrench to Hex Screw (C).
8. Adjust the position of S.Stopper Pin Base Unit so that the tension is 23 ± 2gr.
9. Tighten the screw (A), then reconfirm the tension after the screw (A) is tightened.



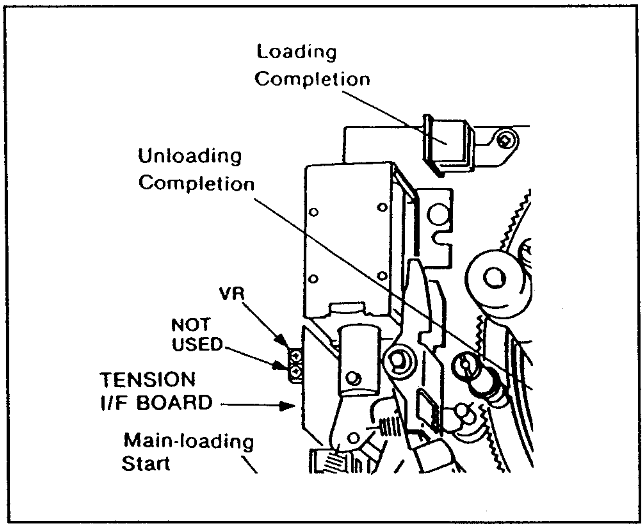
9-4. SENSOR AMP OFFSET ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = 2.5V ± 0.001V DC
TEST	TP2201[G4]
MODE	EJECT
TAPE	
M.EQ	DIGIRAL VOLT METER
INPUT	
ADJ.	VR (on the Tension I/F P.C.Board)

<STEP 1>

1. DIGITAL VOLT METER : TP2201
2. Adjustment VR on the Tension I/F P.C.Board so that the DC voltage is 2.5V ± 0.001V DC.

SPECIFICATION = 2.5V ± 0.001V DC



9-5. SUPPLY SENSOR VOLTAGE ADJUSTMENT (S5 : SERVO)

SPEC	TP2201 = 2.5V ± 0.02V
TEST	TP2201[G4]
MODE	EJECT → STOP → PLAY
TAPE	
M.EQ	DIGITAL VOLT METER, MECHANICAL NEUTRAL, ECCENTRIC SCREWDRIVER
INPUT	
ADJ.	SUPPLY MAGNET SENSOR BASE UNIT POSITION

<STEP 1>

1. Turns power off.
2. Remove the cassette compartment.
3. Turns power on.
4. Set the VTR into Mech Test modeas shown below.

TEST → MECH → NO TAPE → M CASSETTE

5. Remove the P3 Stopper from the Mech Neutral Plate and set the Mech Neutral Plate on the Reel Table.
6. Press STOP key to set the loading completion mode.

<STEP 2>

1. Make sure that the P3 post touches the arm of the Mechanical Neutral Plate as shown in Figure.
2. Confirm that the voltage at TP2201 is 2.5V ± 0.001V.
3. If it is not, loosen 2 screws (A) and insert the eccentric screw driver into hole (B).
4. Adjust the position of the Supply Magnet Sensor Base Unit until the voltage at TP2201 is in specification.

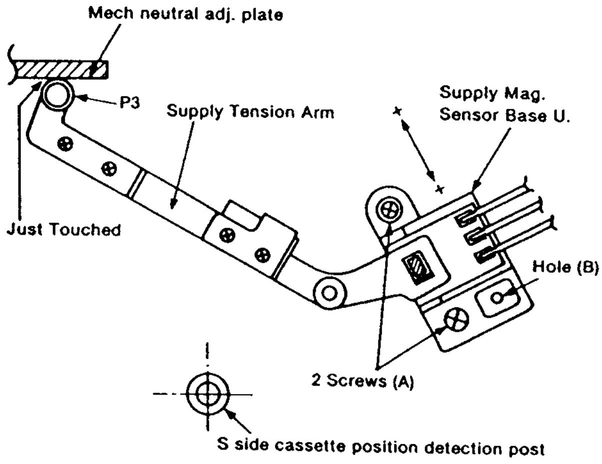
SPECIFICATION : 2.5V ± 0.015V

5. Tighten the 2 screws (A) and make sure the voltage at TP2201 does not change.
   (Make sure the voltage at TP2201 does not change.)

<STEP 3>

1. Place the unit in the PLAYBACK mode.
2. Confirm that the voltage at TP2201 (Vs) ± 0.002V.
3. If it is not, adjust the Supply Magnet sensor Base Unit, follow the procedure in <STEP 3>.

⊘: HOLE B
TP: TP2201 (S5: SERVO)



9-6. LOADING TORQUE ADJUSTMENT (S5 : SERVO)

SPEC	LOADING TORQUE = 60gr.cm ± 2gr.cm
TEST	TAKE UP REEL
MODE	
TAPE	
M.EQ	REEL TORQUE METER
INPUT	
ADJ.	FRONT PANEL ADJUSTMENT VR

<STEP 1>

1. Remove the cassette compartment.
2. Set the service switch SW1-4 ON and turn the power ON.
3. Attach the Dial Torque Gauge Adaptor with the Dial Torque Gauge and set the Dial Torque Gauge on the Take Up Reel Motor.
4. Set the VTR into Mechanism Test mode.

   TEST → SERVO → REEL → MEASURE → L

5. Place the unit in the STOP mode.
6. Place the unit into the Take Up Reel Torque Adjustment mode as shown below.

   TEST → F8 (SERVO) → F2 (REEL) → F + F1 (LOADING)

7. Adjust Front Panel adjustment VR so that the Take Up Reel Torque is within specification.

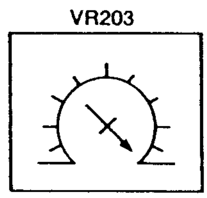
   SPECIFICATION = 60gr.cm ± 2gr.cm

9-7. CONFIRM THAT THE CAPSTAN ERROR MIX RATE VR (S5 : SERVO)

SPEC	
TEST	
MODE	
TAPE	
M.EQ	
INPUT	
ADJ.	VR203[G1], VR2011[ ]

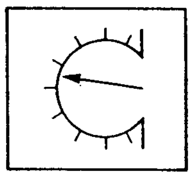
<STEP 1>

1. Turn VR203 to fully clockwise.



<STEP 2>

1. Set VR2011 to 5.5 division.



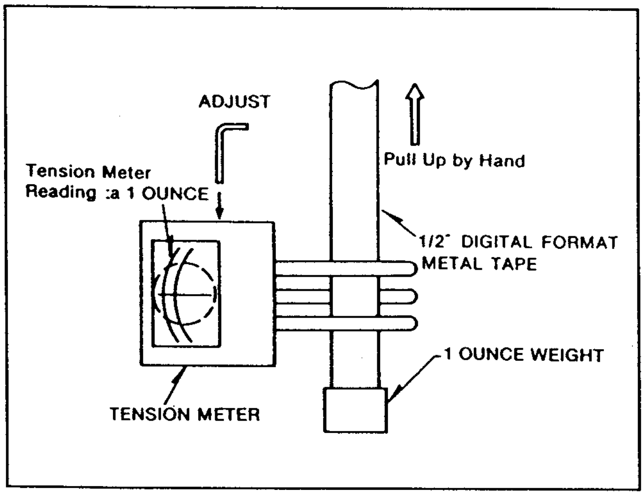
9-8. SUPPLY (FWD.) TENSION ADJUSTMENT (S5 : SERVO)

SPEC	TENSION = 23g ± 2g
TEST	"A" (P2 ~ P3), TP2201[G4]
MODE	PLAY → STOP
TAPE	BLANK 90min TAPE BEGINNING PORTION
M.EQ	TENSION METER, DIGITAL VOLT METER
INPUT	
ADJ.	SUPPLY STOPPER PIN BASE UNIT

<STEP 1>

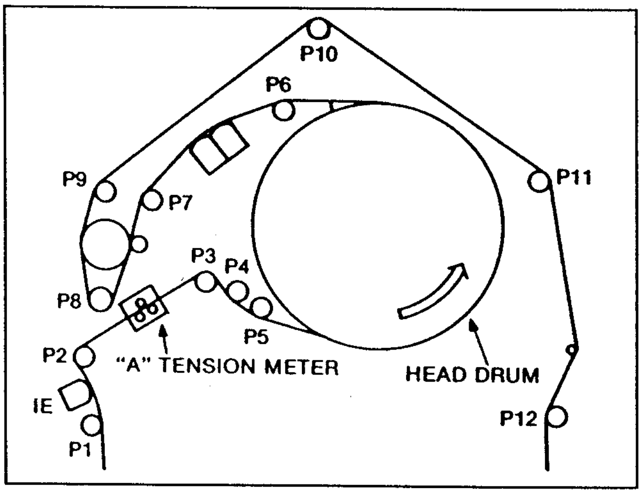
Calibration of Tension meter

1. Before performing of the tape tension adjustment. The Tension Meter should be checked as follows.
2. Use 1/2" Digital Metal tape and a 1 once weight.
3. Pull up a tape by hand as shown in Figure.
4. Adjust a Hex screw on the Tension Meter so that the tension meter reading is set for a 1 once.



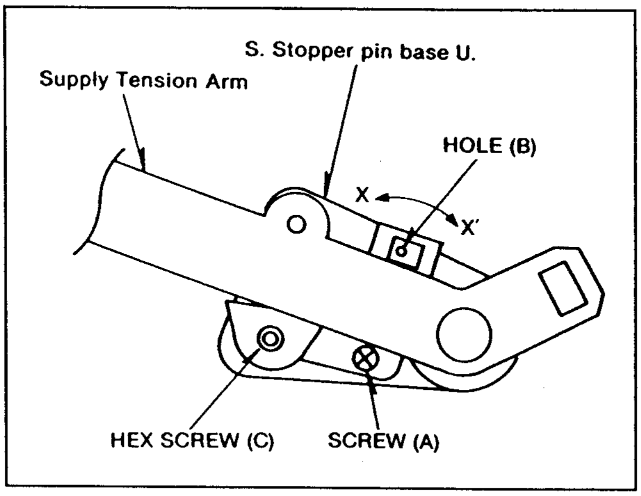
<STEP 2>

1. Insert the tension meter to between P2 and P3 post (portion "A") as shown in Figure.
2. Mode : PLAY, M cassette 90 min.
3. Confirm that the tape tension is 23 ± 2g at the tape beginning portion.



<STEP 3>

1. If it is not within specification, loosen the screw (A).
2. Insert the eccentric screwdriver into Hole (B).
3. Adjust the position of S.Stopper Pin Base Unit so that the supply tension is 18gr ~ 28gr.
4. Insert the Hex Wrench to Hex screw (C).
5. Adjust the position of S.Stopper Pin Base Unit so that the tension is 23 ± 2g.
6. Finally, tighten the screw (A).
7. Reconfirm the tension after the screw (A) is tightened.



<STEP 4>

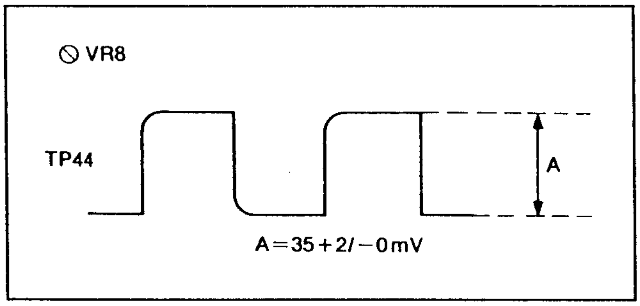
1. Place the unit in STOP mode.
   (Loading completed condition.)
2. SCOPE : TP2201
3. Confirm that the sensor voltage is (2.5V) ± 250mV.

9-9. CTL REC CURRENT ADJUSTMENT (S5 : SERVO)

SPEC	TP44 = 35mV + 2mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND = TPG5[G4]
MODE	REC PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8[G2]

<STEP 1>

1. SCOPE : TP44
2. Adjust VR8 so that the REC CTL pulse is 35 +2/-0 mV as shown in Figure.

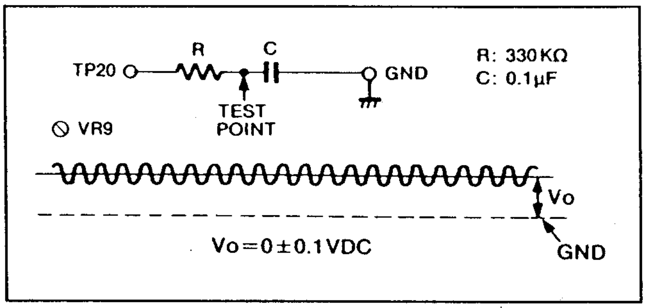


9-10. CONTROL PLAYBACK AMP OFFSET ADJUSTMENT (S5 : SERVO)

SPEC	TP20 + (CR) = 0V ± 0.1V DC
TEST	TP20[H1] ... REFER TO FIGURE
MODE	VAR 0.04
TAPE	NO SIGNAL RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR9[H2]

<STEP 1>

1. SCOPE : TP20
2. Adjust VR9 so that the DC level is 0 ± 0.1V DC.

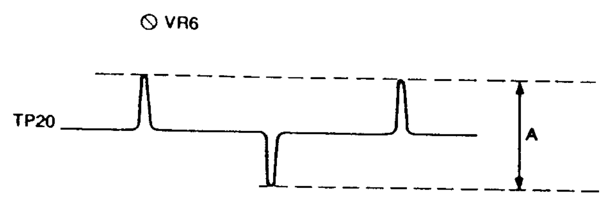


9-11. CTL PLAYBACK AMP GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → PLAY
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR6[H1]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion.
4. Adjust VR6 so that the signal level A is 10 +2 Vp-p.
5. Confirm that the CF MODE and SERVO LED on the Front Panel turned on.



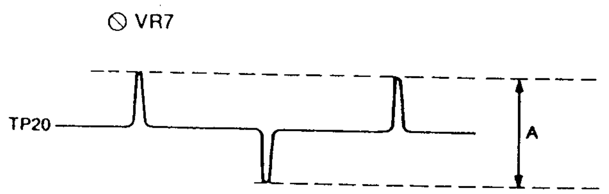
SPECIFICATION: A=10Vp-p+2V/−0V

9-12. CTL PLAYBACK AMP F/V GAIN ADJUSTMENT (S5 : SERVO)

SPEC	TP20 = 10Vpp +2V/-0V
TEST	TP20[H1]
MODE	REC PLAY → VAR SPEED : × 0.52
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR7[F3]

<STEP 1>

1. SCOPE : TP20
2. Supply a color bar signal to Video Input and recorded.
3. Playback a just recorded portion by VAR × 0.52.
4. Adjust VR7 so that the signal level A is 10 +2 Vp-p.



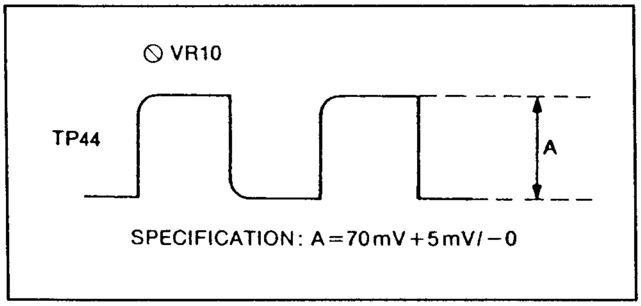
SPECIFICATION: A=10Vp-p+2V/−0V

9-13. CTL REC CURRENT ADJUSTMENT (S5 : SERVO)

SPEC	TP44 - 70mV +5mV/-0mV
TEST	TP44[H4], PROBE 1:1, GND=TPG5[G3 or G4]
MODE	REC PLAY FAST FORMAT × 3 MODE
TAPE	SELF RECORDED TAPE
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR to VIDEO IN
ADJ.	VR10[G1]

<STEP 1>

1. SCOPE : TP44
2. Place the unit in the Fast Format (X3) mode.
3. Adjust VR10 so that the signal level A is 70mV + 5mV/0mV.



Cf:
Fast Format (X3) mode
HOME
SET UP
FORMAT
EXECUTE

9-14. PG SHIFTER ADJUSTMENT (S5:SERVO)

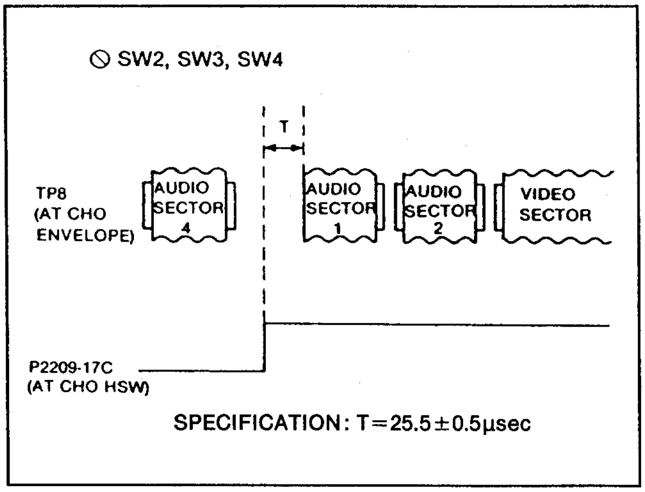
SPEC	T=25.5±0.5µsec
TEST	TP11 (REC AMP) TP37 (SERVO)
MODE	PLAY
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	SW2[F2], SW3

<STEP 1>
MENU CONDITION

TEST MENU

Select the TRACKING FIX/VAR F10 to "FIX".

<STEP 2>
1. SCOPE CH1 : TP11 (REC AMP)
   SCOPE CH2 : TP37 (SERVO)
2. SCOPE TRIGGER : CH2
3. Adjust SW2, 3 and 4 so that the period T is as shown in Figure.



SW2: Fine adjustment
SW3: Pre fine adjustment
SW4: Coarse adjustment

10. TIME CODE SECTION

10-1. SUPER C CURRENT ADJUSTMENT (S6 : TIME CODE)

TEST	VIDEO OUT 3, TV MONITOR
MODE	EE1, EJECT
TAPE	
M.EQ	TV MONITOR
INPUT	75% COLOR BAR
ADJ.	VR1[B1]

<STEP 1>

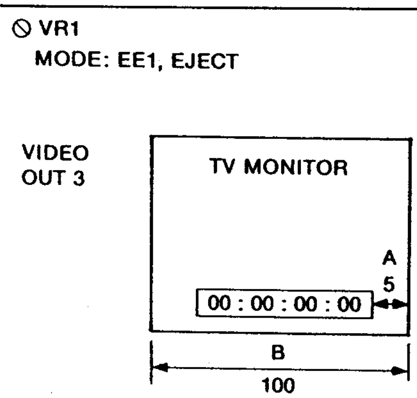
1. Set the VTR EE1 and EJECT mode.
2. Connect the TV monitor to VIDEO OUT 3.
3. Confirm the Time Code super is displayed o the monitor.

<STEP 2>

1. Set TC/CHR mode.
2. Set the POSITION (F1) from FIX to ARRANGE.
3. Press CURSOR RIGHT many times until the Time Code super reaches the right side of the TV monitor.

<STEP 3>

1. Adjust VR1 so that the Time Code super is displayed at right side of the monitor as shown in Figure.



SPECIFICATION: A : B=5 : 100

10-2. PB LTC LEVEL ADJUSTMENT (S6 TIME CODE SUB)

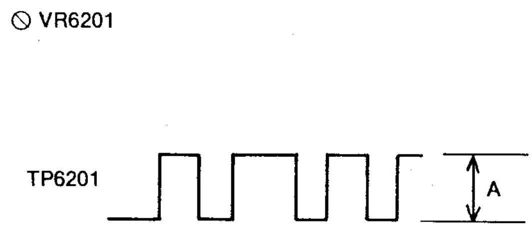
TEST	TP6201
MODE	PLAY
TAPE	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
M.EQ	oscilloscope
INPUT	
ADJ.	VR6201

<STEP 1>

1. Place the VTR in the SHTL × 4mode.
2. Verify that the LTC level A as shown in figure.

<STEP 2>

1. Place the VTR in the normal play mode.
2. Adjust VR6201 so taht the LTC level is same as A level of SHTL × 4 mode.



SPECIFICATION A±0.3V

12. AUDIO PROCESS (S8) BOARD

12-1. DIGITAL AUDIO INTERFACE (1) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP401[H3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH1 (L) 1kHz -18dB, CH2 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR401[A2], VR403[A1]

4000 SERIES

<STEP 1>

1. SCOPE : TP401
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR401 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

12-2. DIGITAL AUDIO INTERFACE (2) ADJUSTMENT (S8 : AUDIO PROCESS)

TEST	TP402[I3]
MODE	EE (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN CH3 (L) 1kHz -18dB, CH4 (R) 2kHz -18dB DIGITAL AUDIO to DIGITAL AUDIO IN
ADJ.	VR402[A3], VR404[A2]

<STEP 1>

1. SCOPE : TP402
2. Confirm that the level is High (+5V).
3. If it is not, adjust VR402 and VR403 so that the level is High (+5V).
4. Confirm that the level is always High (+5V), when turn the power ON.

<STEP 2>

1. Disconnect the Digital Audio Input Connector.
2. Confirm that the level is LOW (0V).

12-3. CUE METER OFFSET ADJUSTMENT (S8 : AUDIO PROCESS)

SPEC	LESS THAN -50dB
TEST	CUE METER
MODE	STOP
TAPE	BLANK TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR4551[B4]

<STEP 1>

1. Set the VTR EE1 and STOP mode.
2. Adjust VR4551 so that the cue meter is less than -50dB.

13. VIDEO A/D PLL (S9) BOARD

Adjust with this section, perform after completed adjustment with L1 and L4 section.

MENU CONDITION
AUDIO IN MENU
Select the VIDEO INPUT F3 to "ANALOG"
VIDEO OUT SET UP MENU
Select the VIDEO STANBY OFF to "EE2"
STANBY OFF
VIDEO : TAPE, EE1, *EE2
MENU CONDITION
TEST MENU
VIDEO FUNCTION
Pless the SCH F10 Key on the Front Panel and display the INPUT REF SCH METER.

13-1. INPUT PLL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	MONITOR TV
MODE	EE2 (EJECT)
TAPE	
M.EQ	MONITOR TV
INPUT	ANALOG COLOR BAR to VIDEO IN
ADJ.	VR401 (PLL ADJ.)[G4]

8000 SERIES

<STEP 1>
1. Connect the MONITOR TV to VIDEO OUT 1.
2. Confirm that the E-E picture is synchronized on Monitor TV.
3. If the E-E picture is not synchronized on Monitor TV, adjust VR401 follow the below adjustment procedure.

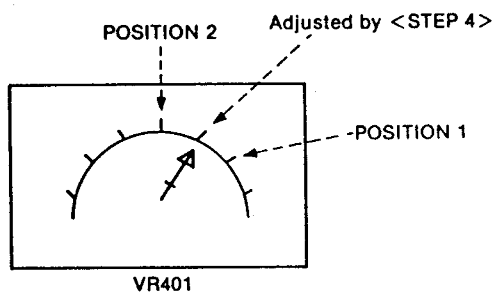
<STEP 2>
1. Turn VR401 fully clockwise and turn power OFF and ON.
2. Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
3. Memorized position of VR401 as shown in Figure (Position 1).

<STEP 3>
1. Turn VR401 fully clockwise and turn power OFF and ON.
2. Slowly turn VR401 to counter clockwise and adjust VR401 so that the E-E picture synchronized on Monitor TV.
3. Memorized position of VR401 as shown in Figure (Position 2).

<STEP 4>
1. Set the VR401 in centered (position 1) and (position 2) sa shown in Figure.

MONITOR TV ⦸ VR401

FOR EXSAMPLE



SPECIFICATION: CENTER OF POSITION 1 and 2

13-2. CF ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	2.6V ± 0.1V
TEST	IC609 Pin4
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR SIGNAL
ADJ.	VR602[H3]

<STEP 1>

1. SCOPE CH1 : IC609 Pin4
2. Adjust VR602 so that the output level is 2.6V ± 0.1V.

13-3. SCH ADJUSTMENT (S9 : VIDEO A/D PLL)

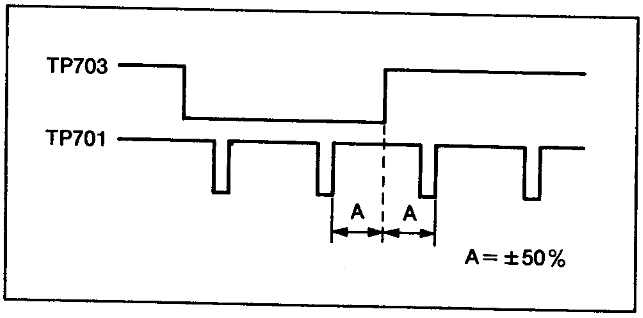
SPEC	AS SHOWN FIGURE
TEST	TP701 [G2], TP703 [G1]
MODE	EE2 (EJECT)
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR SIGNAL TO REF INPUT AND VIDEO IN
ADJ.	VR701[G1]

<STEP 1>

1. SCOPE CH1 : TP703 (TRIGGER)
   CH2 : TP701
2. Set the SW701 to ON.

<STEP 2>

1. Turn VR701 to clockwise.
2. Adjust VR701 so that the waveform phase is as shown in figure.

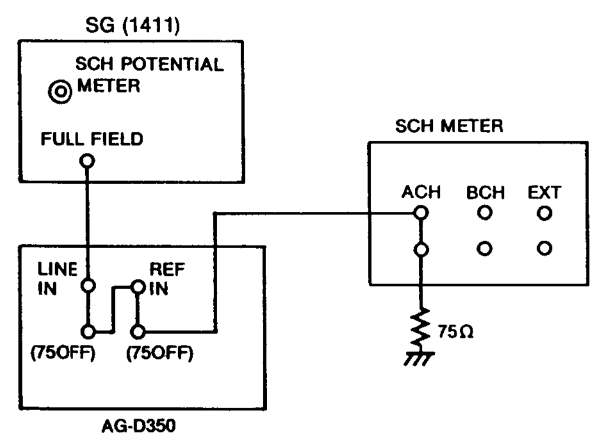


13-4. INCOME CF DETECTION ADJUSTMENT (1) (S9 : VIDEO A/D PLL)

SPEC	ALTERNATE +90° and -90°
TEST	INPUT SCH METER on TEST VIDEO MUNU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1411 COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2)[G1] VR705 (SCH GAIN)[I2] VR706 (SCH OFFSET)[I2]

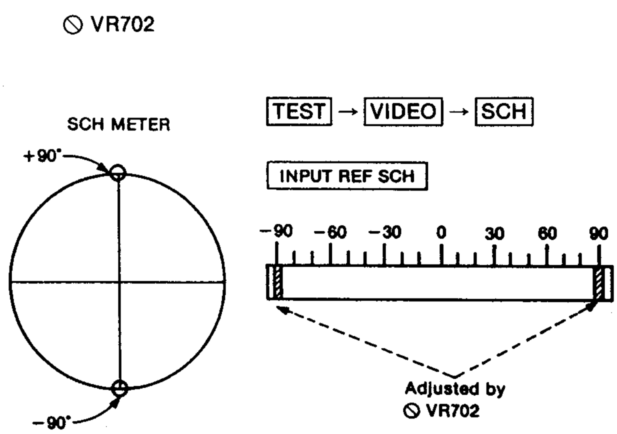
<STEP 1>

1. CONNECTION
2. CONFIRMATION
   Confirmation that the SCH phase on SCH METER.



<STEP 2>

1. Set VR705 and VR706 to center position.
2. Adjust the Potential Meter on 1411 so that the SCH is +90° or -90° by turns.
3. Turn VR702 to fully clockwise.
4. Display the INPUT REF SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
5. Adjust VR702 so that the INPUT REF SCH METER displayed +90° and -90° by turns.
6. After finished this adjustment, perform 13-15 SCH METER ADJUSTMENT.



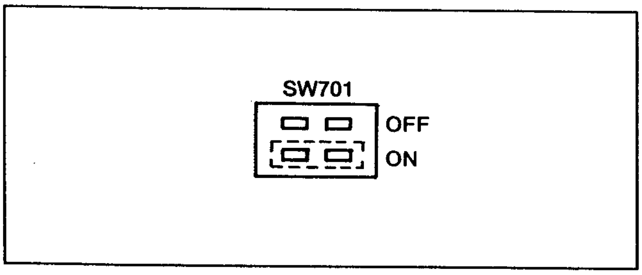
SPECIFICATION: ALTERNATE +90° and −90°

13-5. SCH METER ADJUSTMENT (S9 : VIDEO A/D PLL)

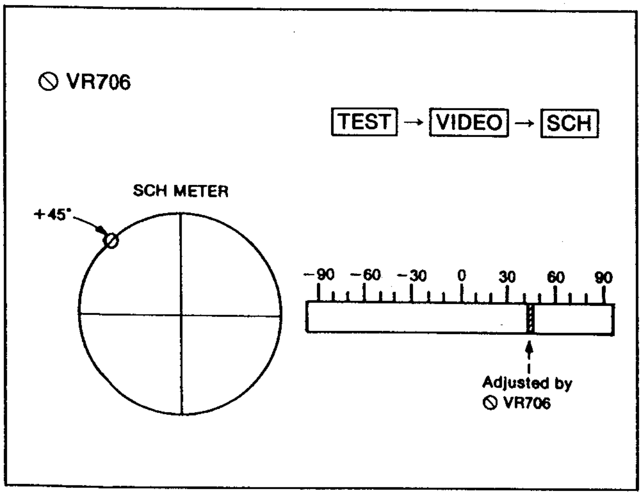
SPEC	
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER
INPUT	1411 COLOR BAR to VIDEO IN
ADJ.	VR705 (SCH GAIN)[I2], VR706 (SCH OFFSET)[I2]

<STEP 1>
MACHINE CONDITION
Refer to <STEP 1> on item 13-2.

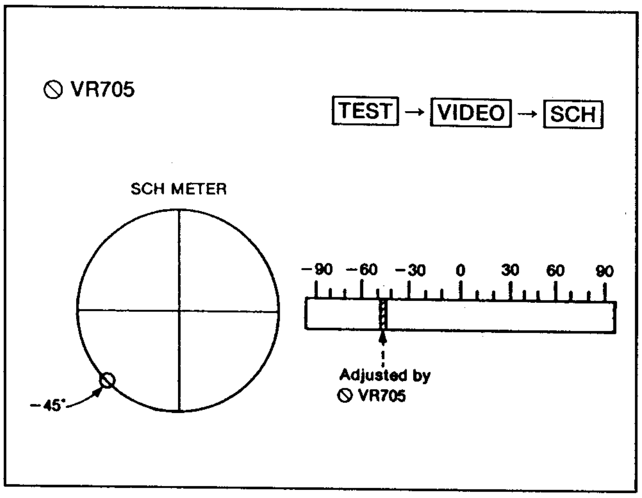
<STEP 2>
1. Confirm that the SCH of SW701 is set to ON position.



<STEP 3>
1. Set the SW701 to ON side as shown in Figure.
2. Adjust the Potention Meter VR on 1411 so that the SCH is +45° at SCH METER.
3. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
4. Adjust VR706 so that the INPUT SCH METER displayed +45°.



<STEP 4>
1. Adjust the Potention Meter VR on 1410 so that the SCH is +45° at SCH METER.
2. Display the INPUT SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
3. Adjust VR705 so that the INPUT SCH METER displayed -45°.



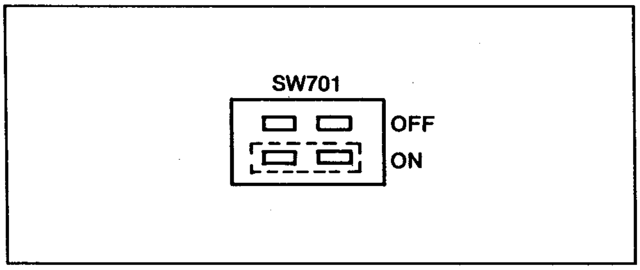
<STEP 5>
1. Re-adjust above <STEP 3> and <STEP 4> until stabilize the SCH indication.

13-6. INPUT SCH DETECTION ADJUSTMENT (S9 : VIDEO A/D PLL)

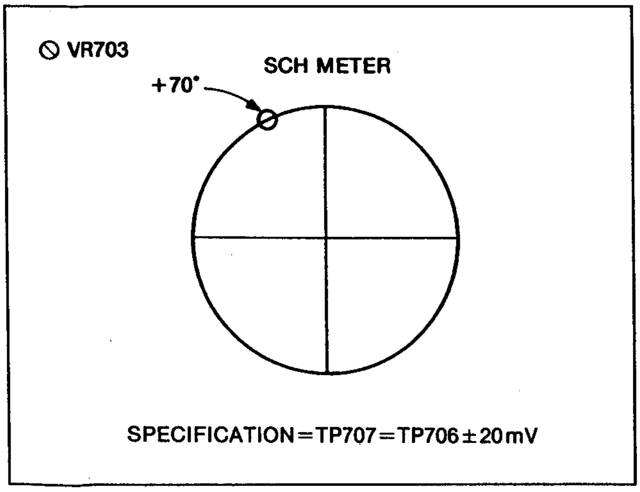
SPEC	Voltage at TP707, TP708 = TP706 ± 20mV
TEST	TP706[I1], TP707[I1], TP708[I2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	1411 75% COLOR BAR to VIDEO IN
ADJ.	VR703 (SCH - H)[I2], VR704 (SCH -L)[I2]

<STEP 1>
MACHINE CONDITION
Refer to <STEP 1> on item 13-2.

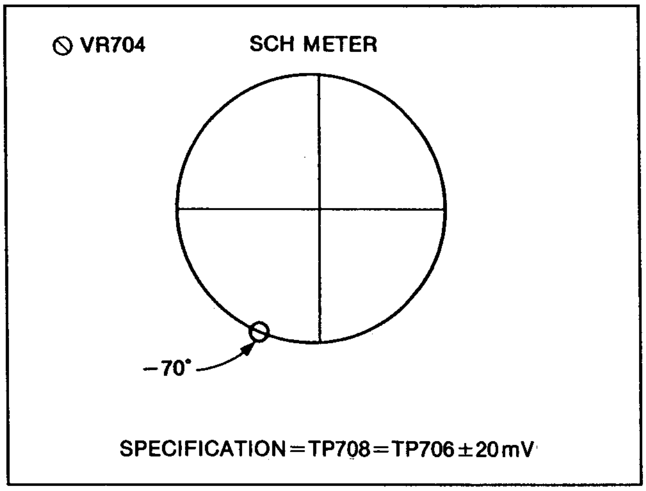
<STEP 2>
1. Confirm that the SCH of SW701 is set to ON position.



<STEP 3>
1. SCH METER : SCH mode
2. Adjust the Potention Meter VR on 1411 so that the SCH is +70° at SCH METER.
3. SCOPE CH1 : TP707
   CH2 : TP706
4. Measure the voltage at TP706.
5. Adjust VR703 so that the DC voltage at TP707 is TP706 ± 20mV.



<STEP 4>
1. Adjust the Potention Meter VR on 1411 so that the SCH is -70° at SCH METER.
2. SCOPE CH1 : TP708
   CH2 : TP706
3. Adjust VR703 so that the DC voltage at TP708 is TP706 ± 20mV.

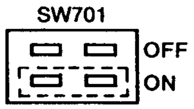


13-7. INCOME CF DETECTION ADJUSTMENT (S9 : VIDEO A/D PLL)

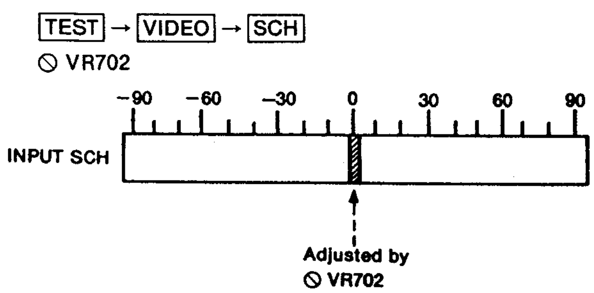
SPEC	FRONT SCH METER DISPLAY 0°
TEST	INPUT SCH METER on TEST VIDEO MENU
MODE	EE2 (EJECT)
TAPE	
M.EQ	
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR702 (SCH DET 2)[G1]

<STEP 1>
MACHINE CONDITION
Refer to <STEP 1> on item 13-2.

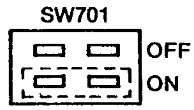
<STEP 2>
1. Confirm that the SCH of SW701 is set to ON position.



<STEP 3>
1. Turn the power OFF and ON.
2. Display the OUT REF SCH METER as refer to MENU CONDITION 2 at the beginning of this SECTION.
3. Adjust VR702 so that the OUT REF SCH METER displays 0°.



<STEP 4>
1. Confirm that the SW701 is set to ON position.

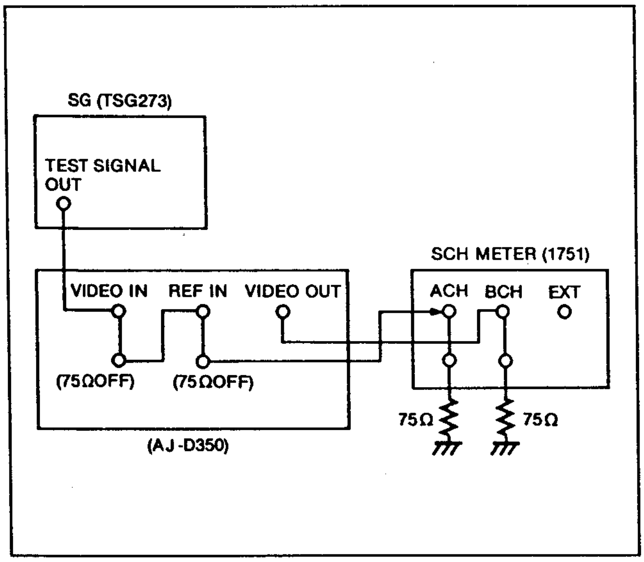


13-8. VIDEO PHASE ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	REFER TO FIGURE
TEST	VIDEO OUT IC611-Pin 2, TP401[G2]
MODE	EE2 (EJECT)
TAPE	
M.EQ	SCH METER OSCILLOSCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR601 (H PHASE)[G2]

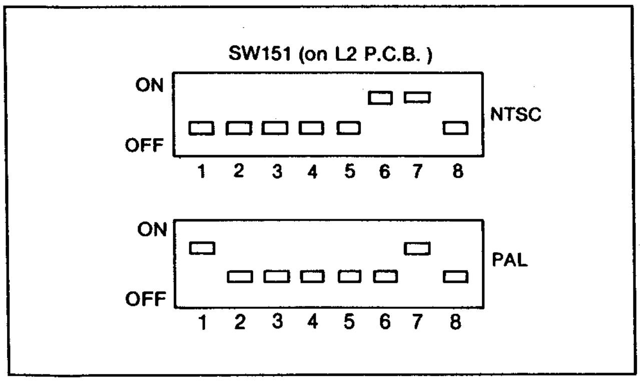
<STEP 1>

1. Connect the VTR as follows.



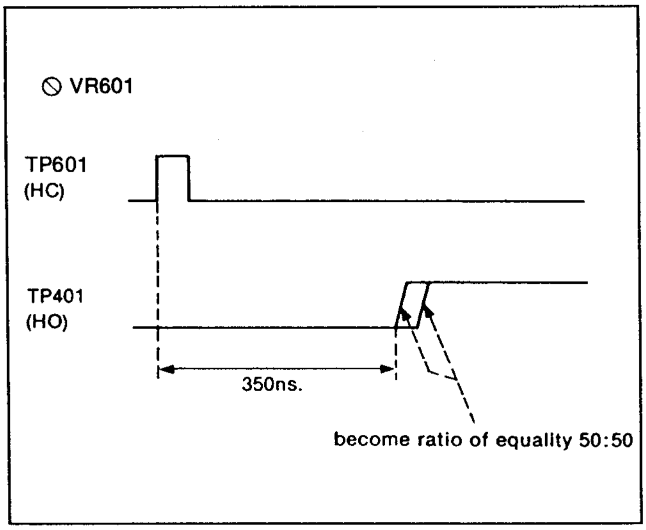
<STEP 2>

1. Set the Dip SW 151 on the L2 P.C.B. as follow as shown in Figure.



<STEP 3>

1. SCOPE CH1 : TP601
   CH2 : TP401
2. Adjust VR601 so that the relation between HC and HO signal as shown in Figure.

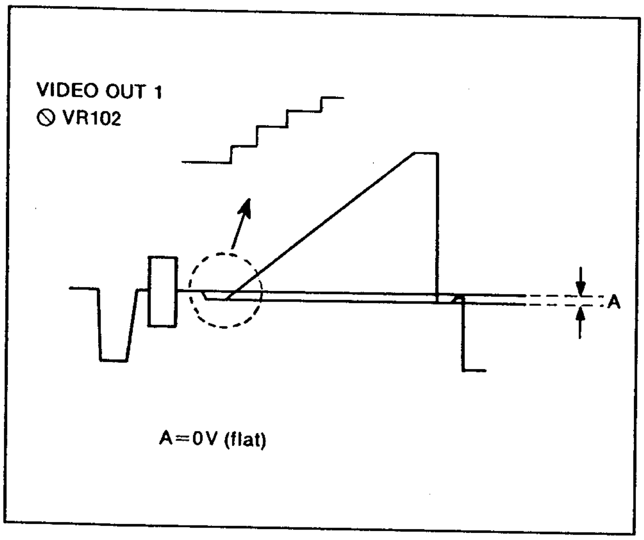


13-9. VIDEO INPUT CLAMP ADJUSTMENT (S9 ; VIDEO A/D PLL)

SPEC	A = 0V (FLAT)
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL RAMP SIGNAL to VIDEO IN
ADJ.	VR102 (CLAMP DC)[B3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR102 so that the A portion is flat as shown in Figure.



<STEP 2>

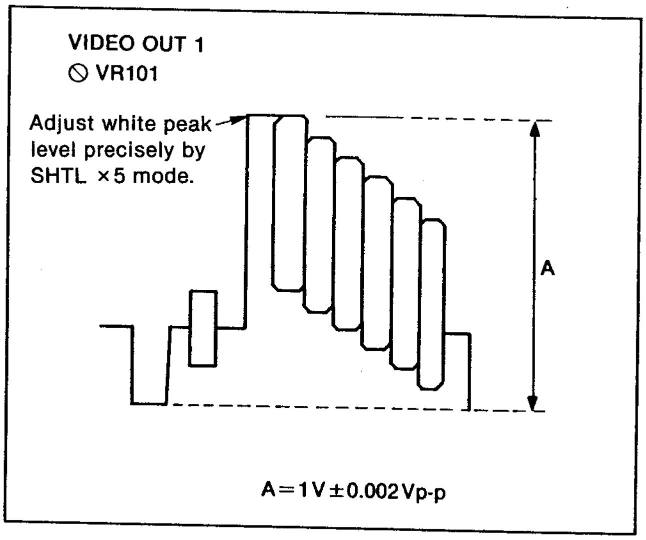
1. Expand WFM monitor by × 5 mode.
2. Confirm that there are 3 stairs in the 5 divisions of WFM monitor as shown in figure.

13-10. VIDEO INPUT LEVEL ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	VIDEO OUT 1 = 1V ± 0.002Vpp
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	VR101 (A/D LEVEL)[A3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust VR101 so that the Video Level (A) is 1 ± 0.002V as shown in Figure.

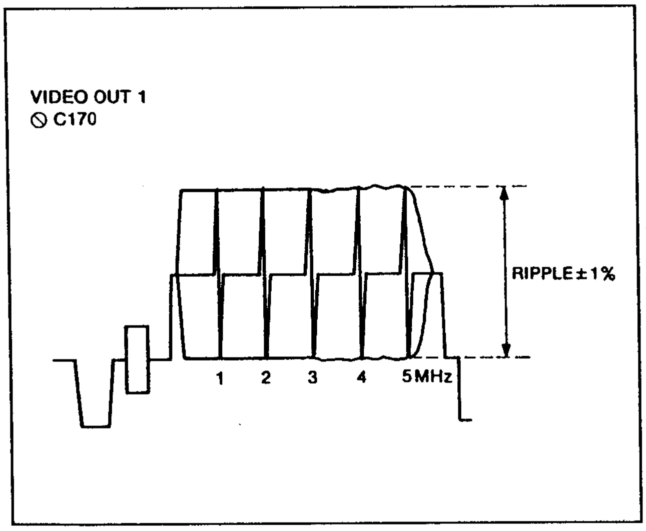


13-11. VIDEO INPUT FREQUENCY ADJUSTMENT (1) (S9 : VIDEO A/D PLL)

SPEC	RIPPLE ± 1%
TEST	VIDEO OUT 1
MODE	EE2 (EJECT)
TAPE	
M.EQ	WAVEFORM MONITOR
INPUT	DIGITAL H SWEEP to VIDEO IN
ADJ.	C170[A2]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust C170 so that level from 1MHz to 4MHz is flat as shown in Figure.

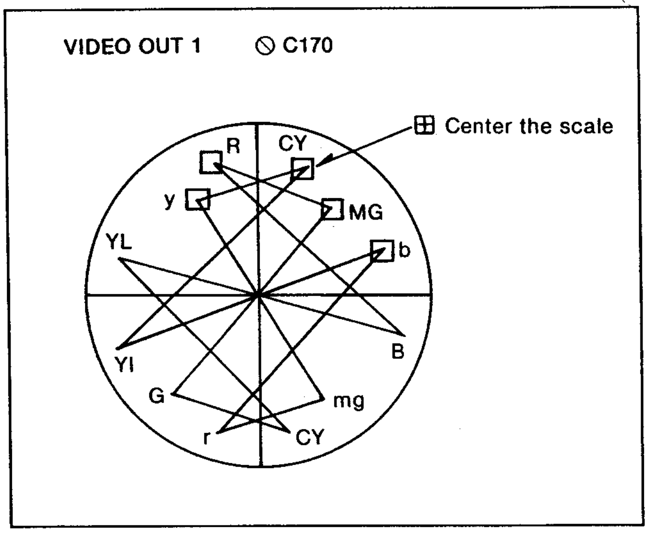


13-12. VIDEO INPUT FREQUENCY ADJUSTMENT (2) (S9 : VIDEO A/D PLL)

SPEC	CENTER OF THE SCALE
TEST	VIDEO OUT 1
MODE	E-E (EJECT)
TAPE	
M.EQ	VECTOR SCOPE
INPUT	DIGITAL 75% COLOR BAR to VIDEO IN
ADJ.	C170[A2], VR103[B3]

<STEP 1>

1. WFM MONITOR : VIDEO OUT 1
2. Adjust C170 so that each vector level is in center the scale of vector scope.
3. Adjust VR103 so that the each vector dot is in center of the box.



13-13. INPUT LEVEL METER ADJUSTMENT (S9 : VIDEO A/D PLL)

SPEC	INPUT LEVEL METER = 0dB
TEST	INPUT LEVEL METER
MODE	E-E (EJECT)
TAPE	
M.EQ	
INPUT	(TSG273) 100% COLOR BAR to VIDEO IN
ADJ.	VR201 (BOT DC ADJ.)[D2], VR202 (AD VRT ADJ.)[D3]

<STEP 1>
MENU CONDITION
VIDEO IN MENU : F5
Select the LEVEL DET to "PEAK".

<STEP 2>
1. Adjust VR202 so that the VIDEO INPUT LEVEL METER is 0dB.

<STEP 3>
MENU CONDITION
VIDEO IN MENU : F5
Select the LEVEL DET to "SYNC".

<STEP 4>
1. Adjust VR201 so that the VIDEO INPUT LEVEL METER is 0dB.

14. REC AMP BOARD

Confirm that the Machine Condition with L2, L3, L4, S1 and S2 board, refer to Machine Condition at the beginning of SECTION 5 (REC/PLAY CH0/CH1)

14-1-(1). REC 2nd HARMONICS DISTORTION ADJUSTMENT (1) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP3 (CH0 A0)[B2], TP4 (CH0 B)[B2]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR200[B6]

<STEP 1>
Set the spectrum analyzer as follows.

(REG 3)

REFERENCE LEVEL	:	0dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	10dB/div
START FREQUENCY	:	20MHz
STOP FREQUENCY	:	70MHz
RES BW	:	300kHz
VIDEO BW	:	10kHz
SWEEP TIME	:	30m sec
TRIGGER	:	FREE RUN

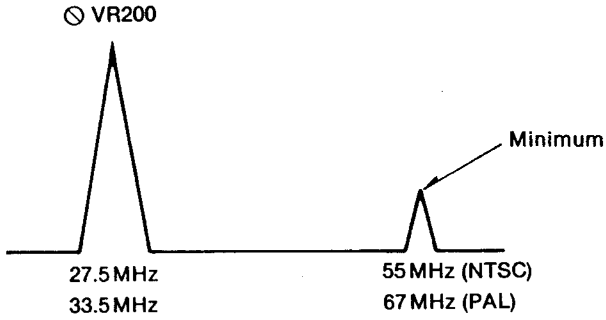
<STEP 2>
1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.

TEST → RF → BS + F8 →
(CURSOR CENTER) → ↓ ↓
→ →

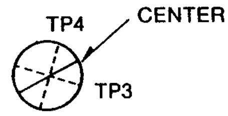
3. Connect the spectrum analyzer probe to TP3.
4. SP USER MENU
   Set the item "HEAD" to A from NOR
5. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
6. Connect the spectrum analyzer probe to TP4.
7. SP USER MENU

   Set the item "HEAD" to B from A

8. Adjust VR200 so that the 2ND Harmonics becomes minimum and memorize the VR200 position.
9. Set the VR200 at certer between item 5 and 8.
10. Press HOME key.

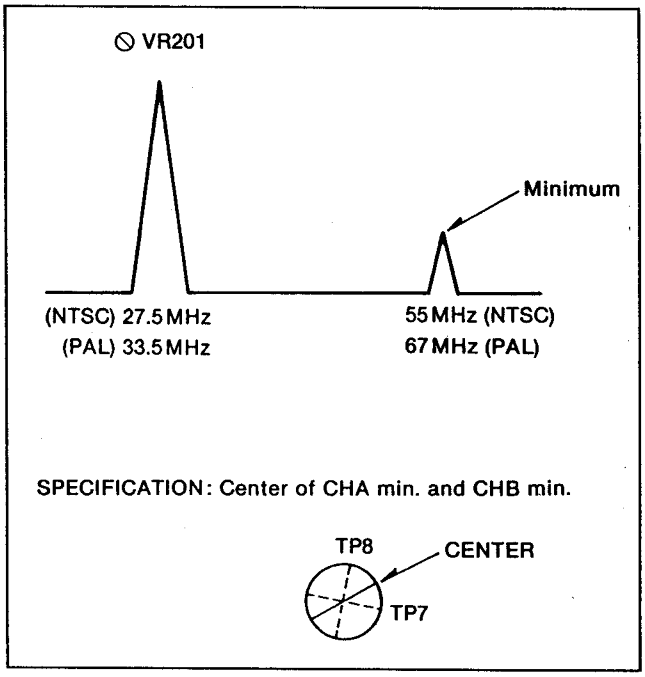


SPECIFICATION: Center of CHA min. and CHB min.



14-1-(2). REC 2nd HARMONICS DISTORTION ADJUSTMENT (2) (REC AMP)

SPEC	MINIMUM 2ND HARMONICS
TEST	TP7 (CH1 A)[B1], TP8 (CH1 B)[B1]
MODE	CW RECORDING
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER
INPUT	75% COLOR BAR
ADJ.	VR201[B6]



<STEP 1>

Set the spectrum analyzer as follows.
(REG 3)

REFERENCE LEVEL	:	0dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	10dB/div
START FREQUENCY	:	20MHz
STOP FREQUENCY	:	70MHz
RES BW	:	300kHz
VIDEO BW	:	10kHz
SWEEP TIME	:	30m sec
TRIGGER	:	FREE RUM

<STEP 2>

1. Insert a self recording tape to the VTR and set the VTR on Recording mode.
2. Set the Front Menu to CW Recording mode as follows.
 TEST → RF → BS + F8 →
 (CURSOR CENTER) → ↓ ↓
 → →
3. Connect the spectrum analyzer probe to TP7.
4. SP USER MENU
 Set the item "HEAD" to A from NOR
5. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
6. Connect the spectrum analyzer probe to TP8.
7. SP USER MENU
 Set the item "HEAD" to B from A
8. Adjust VR201 so that the 2ND Harmonics becomes minimum and memorize the VR201 position.
9. Set the VR201 at certer between item 5 and 8.
10. Press HOME key.

14-2. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH0) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 BOARD), TP207 (REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BAR ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (S MENU) VR2 (CH0 A FREQ), VR4 (CH0 B FREQ)

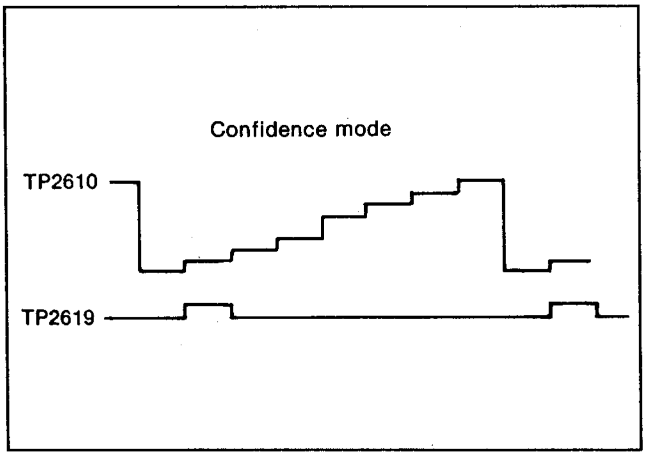
<STEP 1>
Set the spectrum analyzer as follows.
(REG 4)

REFERENCE LEVEL	:	-10.0dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	5dB/div
START FREQUENCY	:	0Hz
STOP FREQUENCY	:	50MHz
RES BW	:	1MHz
VIDEO BW	:	3kHz
SWEEP TIME	:	300m sec
TRIGGER	:	EXT(HEAD SW)

<STEP 2>
Set the VTR shuffling off, error correction off and error concealment off mode.
L2 SW51-2 (OFF), SW51-3 (OFF)
L3 SW1 (OFF), SW2 (OFF), SW3 (OFF), SW4 (OFF)
L4 SW802 (OFF)

<STEP 3>
1. Connect the spectrum analyzer probe to TP8 on S1 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

<STEP 4>
1. SCOPE CH1 : TP2610 (S4)
   SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.
   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) → TAPE → MANUAL EDIT → INSERT
3. Set the VTR PLAY mode.
4. Confirm that the waveform is shown below and the envelope level on the front bar graph panel becomes maximum.
   TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT
   → RF → AT HEIGHT (F7) → BS+F8 → [ ](CURSOR CENTER) → F+[←]
   A and B Heads are selected by cusor key [←] [→].
   If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.

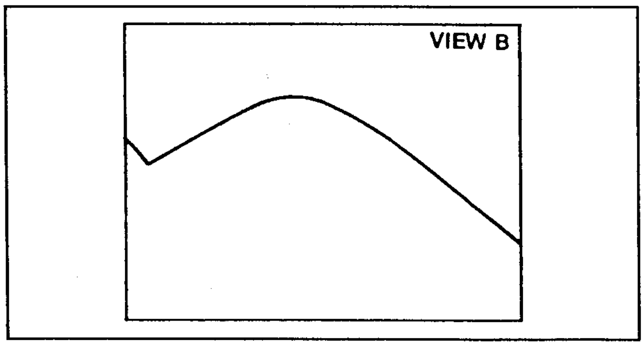


Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>
1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.

   MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 place the AT Heads in the confidence position, when in Playback mode.
The frequency characteristics can then be memorized and compared to the Rec frequency characteristics.



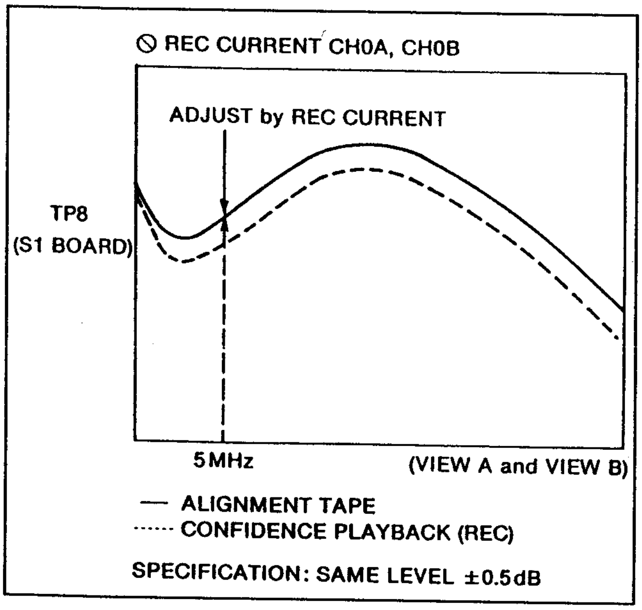
<STEP 6>

1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S1 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position to get maximum envelope on CH0 display.
5. Set the FRONT MENU to REC CURRENT mode.

   TEST → RF → F4(REC CURRENT) → BS+F8 → [ ] (CURSOR CENTER) → F+[←]
   CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by cursor key [↑] [↓].
6. Confirm that envelope on the bar graph is still keeping maximum level. If not, back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spectrum analyzer to REG 5. (refer to set up chart).

<STEP 7>

Adjust the REC Current CH0 A and CH0 B so that the waveform level is same level with the alignment tape play level at 5MHz.

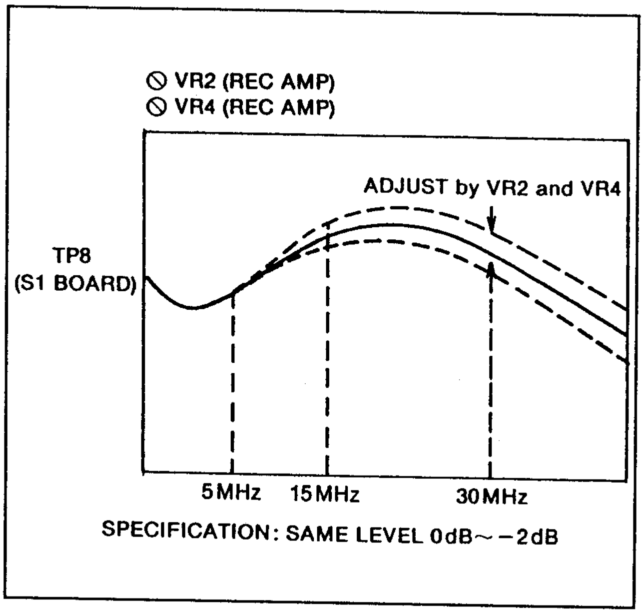


<STEP 8>

1. CH0B Rec Current Adjustment is same as CH0A which is described STEP 6- ~ STEP 7. (Just change the CH).

<STEP 9>

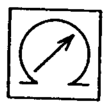
1. Adjust VR2 (CH0 A) and VR4 (CH0 B) so that the waveform level is same at 30MHZ as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH0 B to -128 by using adjustment VR on the front panel. And adjust VR2 (CH0 A) so that the error rate is minimum and same level.
3. Adjust VR4 (CH0 B) so that the error rate is minimum by using the same method above.

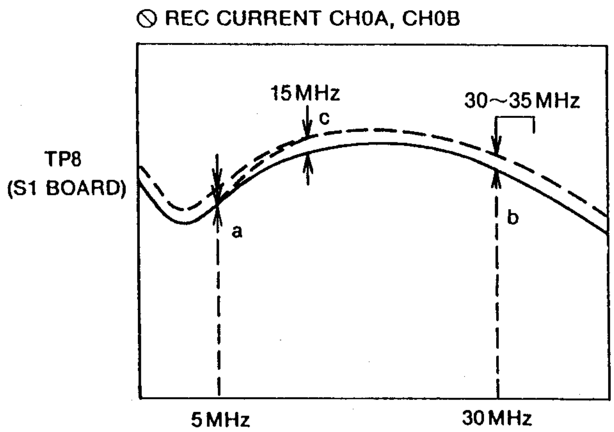


<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH0 A and CH0 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjustment point of VR2 and VR4 are as shown below.





SPECIFICATION: 1) b>O A=O
2) c>O A=C
O=PB level

<STEP 11>

1. Set the machine condition as follows.

   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) → TAPE → MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

14-3. REC CURRENT and REC EQUALIZER ADJUSTMENT (CH1) (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8(S2 BOARD), TP207(S2 BOARD) → EXT IN
MODE	VAR × 1
TAPE	75% COLOR BAR ALIGNMENT TAPE SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	SHUFFLING OFF 75% COLOR BARALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR7 (CH1 A FREQ), VR9 (CH1 B FREQ)

<STEP 1>

Set the spectrum analyzer as follows.
(REG 4)

REFERENCE LEVEL	:	-10.0dBm
ATTEN	:	10dB
DIV (dB/DIV)	:	5dB/div
START FREQUENCY	:	0Hz
STOP FREQUENCY	:	50MHz
RES BW	:	1MHz
VIDEO BW	:	3kHz
SWEEP TIME	:	300m sec
TRIGGER	:	EXT (HEAD SW)

<STEP 2>

Set the VTR shuffling off, error correction off and error concealment off mode.
L2 SW51-2 (OFF), SW51-3 (OFF)
L3 SW1 (OFF), SW2 (OFF), SW3 (OFF), SW4 (OFF)
L4 SW802 (OFF)

<STEP 3>

1. Connect the spectrum analyzer probe to TP8 on S2 Board.
2. Playback a Shuffling off 75% color bar alignment tape.

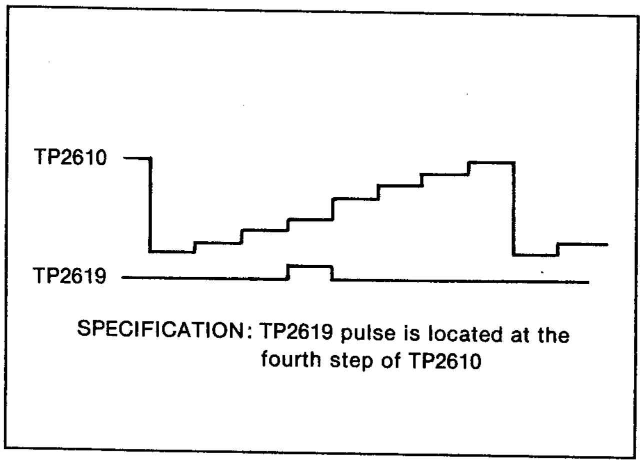
<STEP 4>

1. SCOPE CH1 : TP2610 (S4)
   SCOPE CH2 : TP2619 (S4)
2. Set the machine condition as follows.

   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) →
   TAPE → MANUAL EDIT → INSERT

3. Set the VTR PLAY mode.
4. Confirm that the waveform is shown below and the envelope level on the front panel bar graph becomes maximum.
   If not, adjust Front Panel adjustment knob so that the these two conditions will be satisfied.

   TEST → SERVO → AT → F4(CENTER) → EXIT → EXIT → RF → AT HEIGHT → BS+F8 → [ ](CURSOR CENTER) → F+[←]
   A and B Heads are selected by cusor key [←] [→].

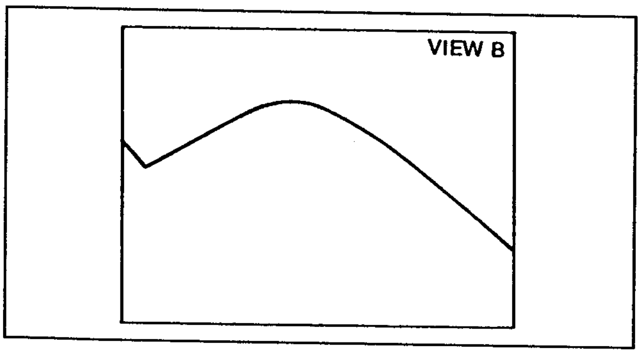


SPECIFICATION: TP2619 pulse is located at the fourth step of TP2610

Note: This AT HEIGHT adjustment is tentative adjustment to get maximum envelope in correct AT Trace. Actual AT Adjustment must be done in AT (S4) Adjustment.

<STEP 5>
1. Memorize the frequency characteristics waveform to VIEW B of the spectrum analyzer.
2. Set the machine condition as follows.
   MANUAL EDIT → INSERT (INSERT OFF mode).

Note: STEP 4 and 5 is place the AT Heads in the confidence position, when in Playback mode. The frequency characteristics can be memorized and compared to the Rec frequency characteristics.

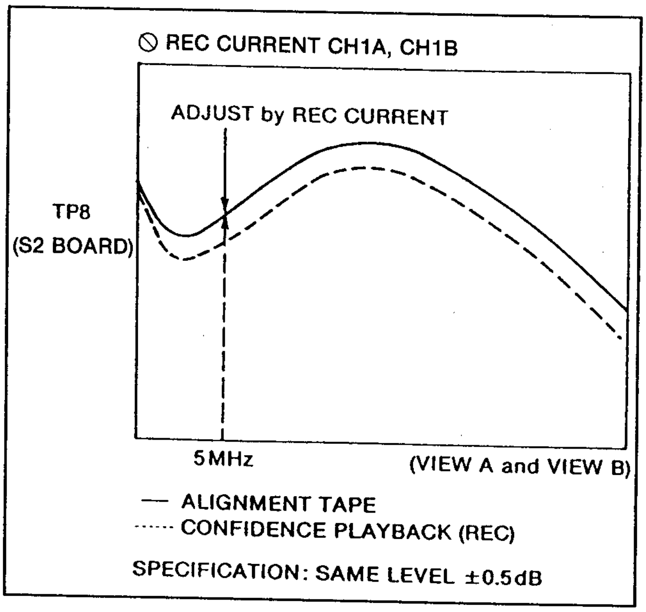


<STEP 6>
1. Eject the alignment tape and insert a self recording tape.
2. Connect the spectrum analyzer probe to TP8 on S2 Board.
3. Set the VTR in Rec mode.
4. Make sure that the AT Head height is correct position. to get maximum envelope on CH1 display.
5. Set the FRONT MENU to REC CURRENT mode.

   TEST → RF → F4(REC CURRENT) → BS+F8 → [ ] (CURSOR CENTER) → F+[←]
   CH0 A, CH0 B, CH1 A, CH1 B Heads are selected by cursor key [↑] [↓].

6. Confirm that envelope on the bar graph is still keeping maximum level. If not, back to AT-HEIGHT adjusting menu and readjust Front Panel adjusting knob to get maximum level of envelope.
7. Set spectrum analyzer to REG 5. (refer to set up chart).

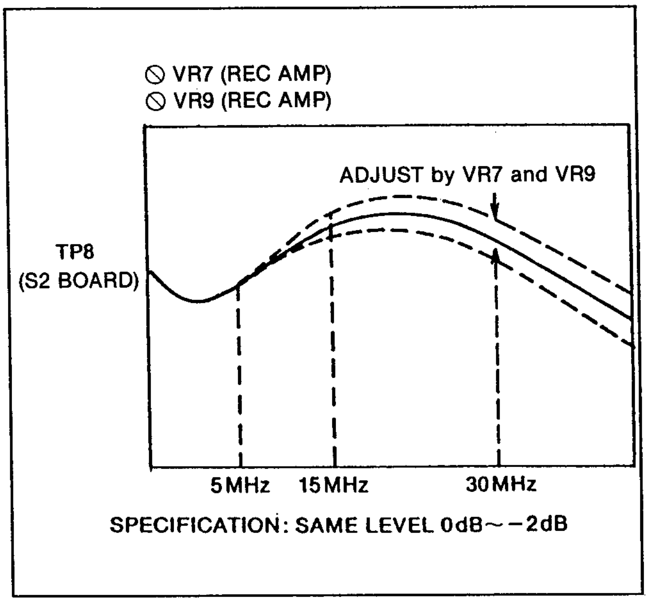
<STEP 7>
Adjust the REC Current CH1 A and CH1 B so that the waveform level is same level with the alignment tape play level at 5MHz.



SPECIFICATION: SAME LEVEL ±0.5dB

<STEP 8>
1. CH1B Rec Current Adjustment is same as CH1A which is described STEP 6-3 ~ STEP 7 (Just change the CH).

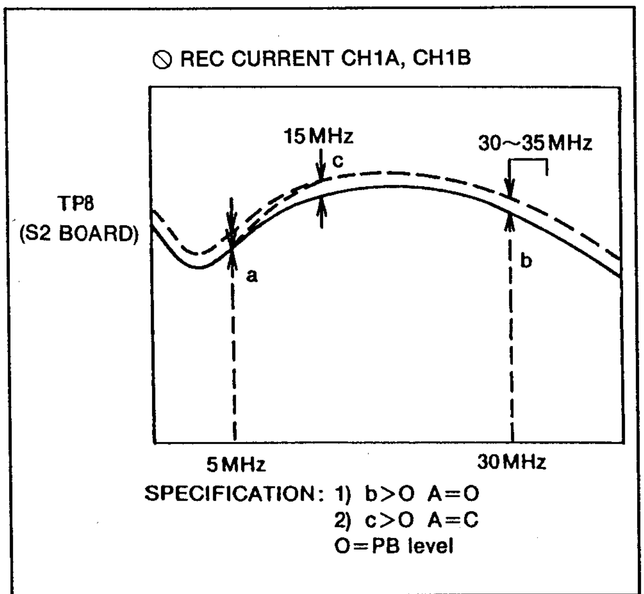
<STEP 9>
1. Adjust VR7 (CH1 A) and VR9 (CH1 B) so that the waveform level is same at 30MHZ as shown below and confirm that the error rate on the front panel is minimum.
2. If it is not, set the CH1 B to -128 by using adjustment VR on the front panel. And adjust VR7 (CH1 A) so that the error rate is minimum and same level.
3. Adjust VR9 (CH1 B) so that the error rate is minimum by using the same method above.



<STEP 10>

1. If level is increased at 30MHz to 35MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same level. (A:0).
2. If the level is increased at 5MHz, adjust REC CURRENT CH1 A and CH1 B so that the output level at 5MHz is same increasing value. (a:c).

Caution : Adjust point of VR7 and VR9 are as shown below.



<STEP 11>

1. Set the machine condition as follows.

   VIDEO OUT → SET UP → STATE → [ ](CURSOR CENTER)
   [→] → [→] → [→](EDIT REC) → TAPE → MANUAL EDIT → INSERT

2. Set the VTR PLAY mode.
3. Confirm that the waveform level is same and error rate is minimum.

<STEP 12>

Set the AT HEIGHT Front Menu to all 0.

<STEP 13>

1. Save the REC CURRENT DATA as follows TEST MENU.
   BS + F8 → F9 (Select USER) → F + F11 (SAVE)

Note: When save the data, REC CURRENT data display will be disappeared.

ADJUSTMENT KNOW HOW (INFORMATION)

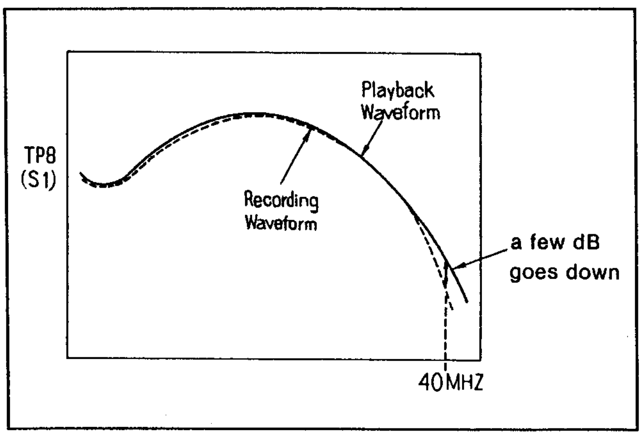
1. Insert a cassette and place the unit in recording mode.
2. Set the machine condition as follows.

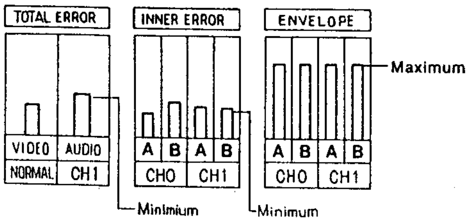
   TEST→RF→REC CURR→[ ](CURSOR CENTER)→
   [→] → (REC CURR).
   CH0 A, CH0 B CH1 A or CH1 B Heads are selected by cursor key [↑] [↓].

3. Adjust each CH by using the adjustment VR on the front panel so that the output envelope is maximum and minimum error on the display.

* In confidence mode, if adjust CH0 A, change the CH0 B envelope output. (CHA recording, CHB playback in confidence mode).

4. Adjust VR2, VR4, VR7 and VR9 on the REC AMP board so that the error rate is minimum.
5. After this adjustment check the frequency characteristics waveforms by using the spectrum analyzer. Refer to the item 14-2 and 14-3.
6. This specification is minimum error rate. (Inner Error rate is less than 4 on the display bar.)
7. If out of specification check the frequency characteristic waveform by using the spectrum analyzer. Connect the spectrum analyzer to TP8 on the S1 board and play back the alignment tape (1) and memorize the frequency characteristic waveform.
8. After memorize, place the unit in the recording mode.
9. If output waveform is same as the playback waveform, readjust the VR612 and VR613 so that the output level goes down a few dB level around 40MHz portion and minimum error rate as shown in Figure.





REC CURRENT	
CH0A	+ 110
CH0B	− 120
CH1B	+ 53
CH1A	+ 52

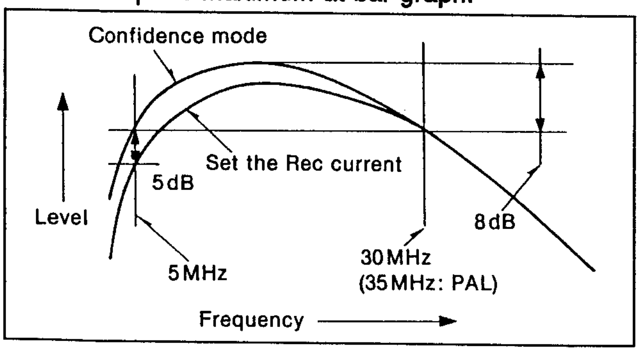
FINAL CONFIRMATION

SPEC	REFER TO FIGURE
TEST	TP8(S1,S2 BOARD), TP207(REC AMP BOARD) → EXT IN
MODE	REC mode
TAPE	SELF RECORDING TAPE
M.EQ	SPECTRUM ANALYZER, 50Ω PROBE WITH CLIP
INPUT	75% COLOR BAR SHUFFLING OFF ALIGNMENT TAPE
ADJ.	FRONT PANEL REC CURRENT (SP MENU) VR2, VR4, VR7, VR9

1. Set the spectrum analyzer as shown item 14-2.
2. Connect the spectrum analyzer to TP8.
3. Connect the EXT input of spectrum analyzer to TP207.
4. Place the unit in the recording mode and memories the frequency characteristics waveform to VIEW B of the spectrum analyzer.
5. Set the Rec current of front panel so that the output spectrum of 5MHz goes down to -5dB.
6. Confirm that the output spectrum as shown in figure.
7. If it is not, readjust the Rec current of front panel and VR2, VR4, VR7 and VR9.

MIX point of Both Spectrum = 30MHz ± 3MHz (NTSC)
35MHz → 3MHz (PAL)

8. Confirm that the error rate is minimum and envelope is maximum at bar graph.



14-4. RF2 ENVELOPE DETECTION ADJUSTMENT

SPEC	MAX. ENVELOPE ON FRONT METER
TEST	FRONT METER OF TEST RF MENU
MODE	PLAY
TAPE	COLOR BAR SECTION OF ALIGNMENT TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	
ADJ.	VR10[B3](CH1 OFF), VR12[B3](CH1 GAIN) VR5 [F1], VR11 [G1]

<STEP 1>

1. Set VR11 to center position
2. SCOPE CH1 : TP1
   CH2 : TP207 for Trigger
3. Adjust VR5 so that the DC voltage is 1.5V ± 0.1V.

<STEP 2>

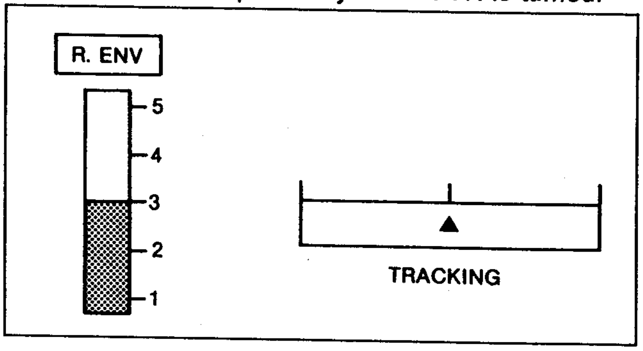
1. Turn the VR10 fully colockwise.
2. Playback the alignment tape color bar portion.
3. Set the tracking FIX mode.

   TEST → RF → TRACKING → FIX

4. Adjust VR12 so that the envelope meter shows 3.0 as shown in figure.
5. Set the tracking variable mode.

   TEST → RF → TRACKING → VAR

   Confirm the envelope meter value is changed when the front panel adjustment VR is turned.

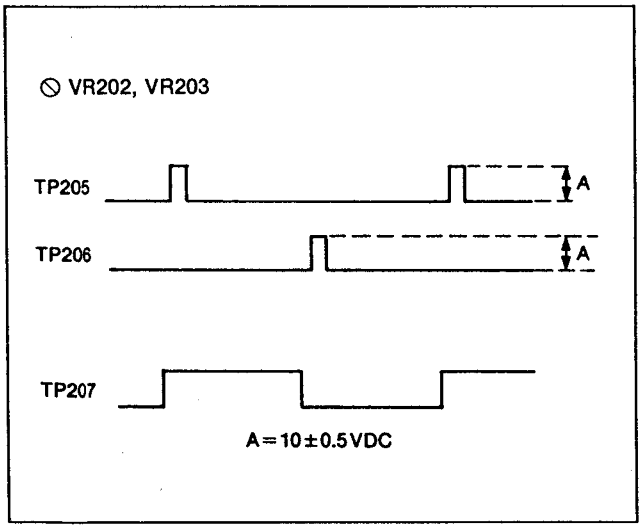


14-5. ROTARY ERASE ADJUSTMENT (REC AMP)

SPEC	REFER TO FIGURE
TEST	TP8 (S1 and S2)[E2], TP205[J5], TP206[K5],
MODE	AUDIO INSERT → VAR X 1
TAPE	BLANK TAPE
M.EQ	400MHz OSCILLOSCOPE
INPUT	75% COLOR BAR to VIDEO IN
ADJ.	VR202[O3], VR203[N1]

<STEP 1>

1. SCOPE CH2 : TP205
   CH3 : TP206
   CH4 : TP207
2. SCOPE TRIGGER : CH4
3. Disconnect the P504 and P511.
4. Set the "AUDIO INSERT" mode on MENU condition.
5. Place the unit in the Audio Insert mode. (PLAY --> REC)
6. Adjust VR202 so that the DC voltage is 10 ± 0.5V DC as shown in Figure.
7. Adjust VR203 so that the DC voltage is 10 ± 0.5V DC as shown in Figure.

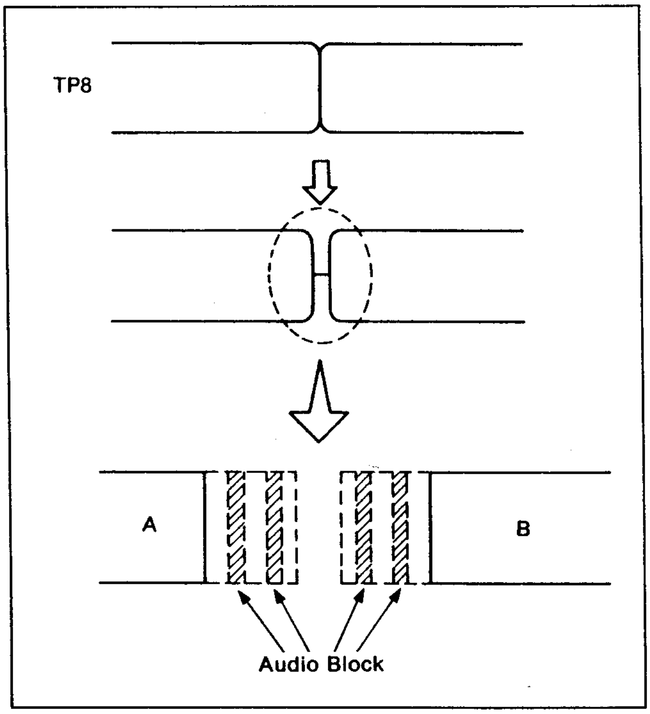


<STEP 2>

1. SCOPE CH1 : TP8/TPG5 (S1 board)
   CH4 : TP207
2. Playback an after adjustment recorded portion on VAR X 1 mode.
3. Confirm that the Audio Block of envelope is erased as shown in Figure.

<STEP 3>

1. SCOPE CH1 : TP8/TPG5 (S2 board)
   CH4 : TP207
2. Confirm that the envelope is within the above specification.
3. Re-connect the P504 and P511.



15. HEAD AMP REGULATOR BOARD

15-1. DC OUTPUT ADJUSTMENT (H.A REGURATOR)

SPEC	SV DC ± 0.1V DC
TEST	TP5
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR2

<STEP 1>

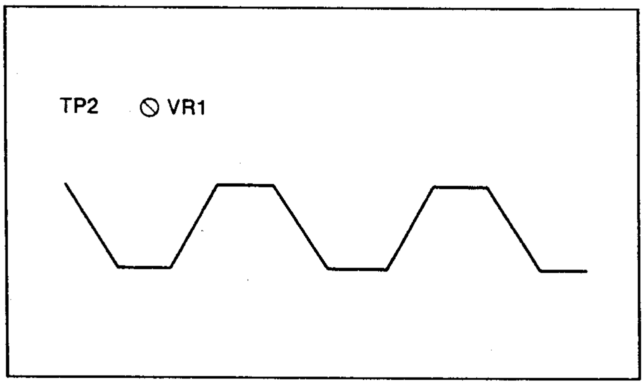
1. OSCILLOSCOPE : TP5
2. Adjust VR2 so that the adjust DC is 8V DC ± 0.1V DC.

15-2. WAVEFORM SHADER ADJUSTMENT (H.A REGURATOR)

SPEC	AS SHOWN FIGURE
TEST	TP2
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	COLOR BAR
ADJ.	VR1

<STEP 1>

1. OSCILLOSCOPE : TP2
2. Adjust VR1 so that the output waveform is as shown below.



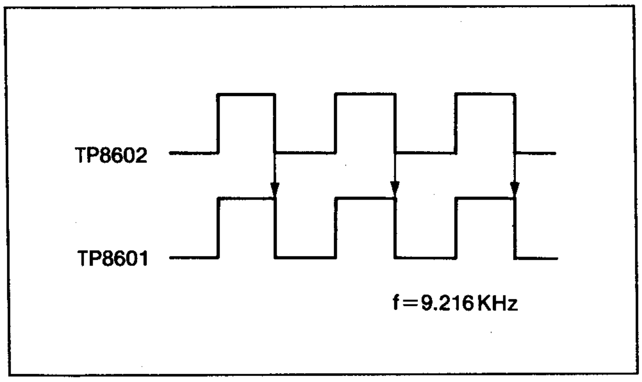
16. VIDEO/AUDIO REC (L2) BOARD

16-1. PLL (1) ADJUSTMENT

SPEC	AS SHOWN FIGURE
TEST	TP8602, TP8601
MODE	PITCH CONTROL ± 15%
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8601[B6]

<STEP 1>
1. SCOPE CH1 : TP8602 (TRIGGER)
   CH2 : TP8601
2. MENU CONDITION
   HOME MENU SET UP → PRPL ON
   Set the Program play to ± 15%
3. Confirm that the waveforms are locked as shown in figure.

<STEP 2>
1. If it is not, adjust VR8601 so that the waveform are locked.

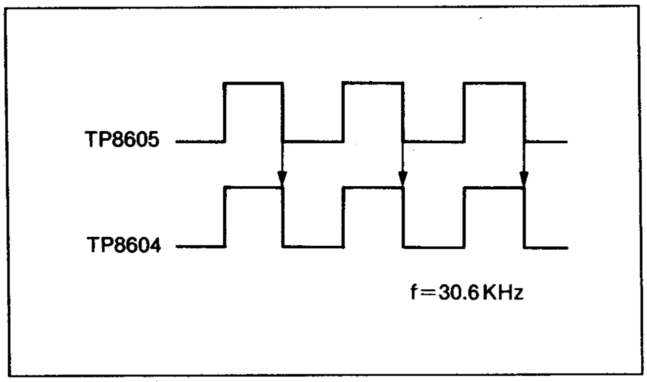


16-2. PLL (2) ADJUSTMENT

SPEC	AS SHOWN FIGURE
TEST	TP8605, TP8604
MODE	PITCH CONTROL ± 15%
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8602[D5]

<STEP 1>
1. SCOPE CH1 : TP8605 (TRIGGER)
   CH2 : TP8604
2. MENU CONDITION
   HOME MENU SET UP → PRPL ON
   Set the Program play to ± 15%
3. Confirm that the waveforms are locked as shown in figure.

<STEP 2>
1. If it is not, adjust VR8602 so that the waveform are locked.



16-3. PLL (3) ADJUSTMENT

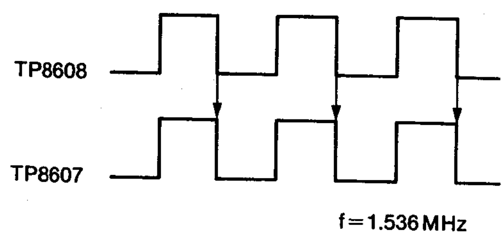
SPEC	AS SHOWN FIGURE
TEST	TP8608, TP8607
MODE	PITCH CONTROL ± 15%
TAPE	75% COLOR BAR PORTION ALIGNMENT TAPE
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR8603[D4]

<STEP 1>

1. SCOPE CH1 : TP8608 (TRIGGER)
   CH2 : TP8607
2. MENU CONDITION
   HOME MENU SET UP → PRPL ON
   Set the Program play to ± 15%
3. Confirm that the waveforms are locked as shown in figure.

<STEP 2>

1. If it is not, adjust VR8603 so that the waveform are locked.



17. SYSTEM CONTROL (S7) BOARD

SPEC	2.00V ± 0.01V
TEST	TP1[B3]
MODE	EJECT
TAPE	
M.EQ	OSCILLOSCOPE
INPUT	
ADJ.	VR1[A4]

<STEP 1>

1. MENU CONDITION
   TEST → RF → REC CNT → (cursor center)
2. Memorize the REC current value and adjust the REC current value are +127 on the every channels.

<STEP 2>

1. SCOPE CH1 : TP1
2. Adjust VR1 so that the output level is 2.00V ± 0.01VDC.
3. Reset the REC current value to original position.

SPECTRUM ANALYZER SETUP
(MODEL HP8591A)

1. SETUP --- REG 1

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

2. SETUP --- REG 2

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) CENTER FREQUENCY	27.5MHz
(5) FREQUENCY SPAN	10MHz
(6) RES BW	100kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	30

3. SETUP --- REG 3

ITEM	PARAMETER
(1) REF LEVEL	0dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	10dB/div
(4) START FREQUENCY	20MHz
(5) STOP FREQUENCY	70MHz
(6) RES BW	300kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIMER	30msec
(9) TRIGGER	FREE RUM

4. SETUP --- REG 4

ITEM	PARAMETER
(1) REF LEVEL	-10dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FRQUENCY	50MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)
(10) VID AVG	10

5. SETUP --- REG 5

ITEM	PARAMETER
(1) REF LEVEL	-20dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	0MHz
(5) STOP FREQUENCY	50MHz
(6) RES BW	1kHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	300msec
(9) TRIGGER	EXT (HEAD SW)

6. SETUP --- REG 6

ITEM	PARAMETER
(1) REF LEVEL	-15dBm
(2) ATTEN	10dB
(3) DIV (dB/DIV)	5dB/div
(4) START FREQUENCY	27.5MHz
(5) STOP FREQUENCY	0MHz
(6) RES BW	1MHz
(7) VIDEO BW	3kHz
(8) SWEEP TIME	200msec
(9) TRIGGER	EXT (HEAD SW)
(10)VID AVG	5

Service Manual

Abbreviations
and
IC Informations

Panasonic
Broadcast Systems

P.C.BOARD PIN ABBREVIATIONS

CONTENTS

P.C.BOARD PIN ABBREVIATIONS

P001 A (L1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	+15V (UN)		+15V (UNREGULATED)	
8	-15V (UN)		-15V (UNREGULATED)	
9	GND (A)			
10	CH1 IN G		CH1 LINE IN GND	
11	CH2 IN G		CH2 LINE IN GND	
12	CH3 IN G		CH3 LINE IN GND	
13	CH4 IN G		CH4 LINE IN GND	
14	GND (A)			
15	CH1 OUT	O	CH1 LINE OUT	
16	GND (A)		CH1 LINE OUT GND	
17	CH4 OUT	O	CH4 LINE OUT	
18	GND (A)		CH4 LINE OUT GND	
19	GND (A)			
20				
21				
22				
23				
24	AV AB 13	I	AV ADDRESS BUS	
25	AV AB 10	I	AV ADDRESS BUS	
26	AV AD 7	I	AV ADDRESS DATA BUS	
27	AV AD 4	I	AV ADDRESS DATA BUS	
28	AV AD 1	I	AV ADDRESS DATA BUS	
29	AV RD	I	AV READ	
30				
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P002 A' (L1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DSD 1	I	SERIAL DATA INPUT CH1/CH2	
3				
4	ASD 1	O	SERIAL DATA OUTPUT CH1/CH2	
5				
6				
7				
8				
9				
10				
11	AV DATA 5	I	VIDEO DAC INPUT	
12	AV DATA 2	I	VIDEO DAC INPUT	
13	AV DATA -1	I	VIDEO DAC INPUT	
14	AV CLK	I	VIDEO DAC CLK IN	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	RET V	I	INCOME VIDEO INPUT	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	V1 OUT	O	VIDEO 1 OUTPUT	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	WFM OUT	O	WFM OUTPUT	
21	GND (A)		GND (ANALOG CIRCUIT)	
22	GND (A)			
23				
24				
25				
26				
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P001 B (L1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	+15V (UN)		+15V (UNRAGURETED)	
8	-15V (UN)		-15V (UNREGULATED)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	CH1 IN C	I	CH1 LINE IN COLD	
11	CH2 IN C	I	CH2 LINE IN COLD	
12	CH3 IN C	I	CH3 LINE IN COLD	
13	CH4 IN C	I	CH4 LINE IN COLD	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	CH2 OUT	O	CH2 LINE OUT	
16	GND (A)		CH2 LINE OUT GND	
17	MOL OUT	O	MONITOR L OUT	
18	GND (A)		MONITOR L OUT GND	
19	GND (A)		GND (ANALOG CIRCUIT)	
20				
21	AMCK	I	ANALOG AUDIO MASTER CLOCK	
22	AMCK L	I	ANALOG AUDIO MASTER CLOCK LOW	
23	ABCK	I	ANALOG AUDIO BIT CLOCK	
24	AV AB 14	I	AV ADDRESS BUS	
25	AV AB 11	I	AV ADDRESS BUS	
26	AV AB 8	I	AV ADDRESS BUS	
27	AV AD 5	I	AV ADDRESS DATA BUS	
28	AV AD 2	I	AV ADDRESS DATA BUS	
29	AV ALE	I	AV ADDRESS LOAD ENABLE	
30	AV RESET	I	AV RESET	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P002 B' (L1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3	DSD L	I	SERIAL DATA INPUT L/R	
4				
5				
6				
7				
8				
9				
10				
11	AV DATA 6	I	VIDEO DAC INPUT	
12	AV DATA 3	I	VIDEO DAC INPUT	
13	AV DATA 0	I	VIDEO DAC INPUT	
14	AV CLK L	I	VIDEO DAC CLK INPUT	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	RF IN		USING FOR RF WFM	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	V2 OUT		VIDEO 2 OUTPUT	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	CHAR DAT		CHARACTER DATA FOR SUPER	
21	GND (A)		GND (ANALOG CIRCUIT)	
22	GND (A)		GND (ANALOG CIRCUIT)	
23				
24				
25				
26				
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P001 C (L1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	+15V (UN)		+15V (UNREGULATED)	
8	-15V (UN)		-15V (UNREGULATED)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	CH1 IN H	I	CH1 LINE IN HOT	
11	CH2 IN H	I	CH2 LINE IN HOT	
12	CH3 IN H	I	CH3 LINE IN HOT	
13	CH4 IN H	I	CH4 LINE IN HOT	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	CH3 OUT	O	CH3 LINE OUT	
16	GND (A)		CH3 LINE OUT GND	
17	MOR OUT	O	MONITOR R OUT	
18	GND (A)		MONITOR R OUT GND	
19	GND (A)		GND (ANALOG CIRCUIT)	
20				
21				
22				
23	AWCK	I	ANALOG AUDIO WORD CLOCK	
24	AV AB 15	I	AV ADDRESS BUS	
25	AV AB 12	I	AV ADDRESS BUS	
26	AV AB 9	I	AV ADDRESS BUS	
27	AV AD 6	I	AV ADDRESS DATA BUS	
28	AV AD 3	I	AV ADDRESS DATA BUS	
29	AV AD 0	I	AV ADDRESS DATA BUS	
30	AV WR	I	AV WRITE	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P002 C' (L1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DSD 3	I	SERIAL DATA INPUT CH3/CH4	
3				
4	ASD 3	O	SERIAL DATA OUTPUT CH3/CH4	
5				
6				
7				
8				
9	SYNC BLK		SYNC BLANKING	
10	BURST FL		CLAMP PULSE (BURST FLAG)	
11	AV DATA 7	I	VIDEO DAC INPUT	
12	AV DATA 4	I	VIDEO DAC INPUT	
13	AV DATA 1	I	VIDEO DAC INPUT	
14	AV DATA -2	I	VIDEO DAC INPUT	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	CTL IN		USING FOR CTL WFM	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	V3 OUT		VIDEO 3 OUTPUT	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	CHAR GAT		CHARACTER GATE FOR SUPER	
21	GND (A)		GND (ANALOG CIRCUIT)	
22	GND (A)		GND (ANALOG CIRCUIT)	
23				
24				
25				
26				
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P003 A (L2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	DIF CK	I	DIGITAL INTERFACE CLOCK (POS)	
6	DIF CK (NEG)	I	DIGITAL INTERFACE CLOCK (NEG)	
7	INCOM HA	O	INCOME H RESET	
8	INCOM FNO	O	INCOME FIELD NO	
9	BYP1 4FSC		BYPASS 1 4FSC (POS)	
10	BYP1 4FSC (NEG)		BYPASS 1 4FSC (NEG)	
11	REF H0		REF H OUT	
12	REF CS	I	REF COMPOSITE SYNC	
13	H RST		H RESET	
14	INCOM CS		INCOME COMPOSITE SYNC	
15	BYP2 4FSC		BYPASS 2 4 FSC	
16	BYP2 4FSC (NEG)		BYBASS 2 4 FSC LOW	
17	AU DATA IN 5	I	AUDIO REC DATA	
18	AU DATA IN 2	I	AUDIO REC DATA	
19	AU DATA GND		AUDIO REC DATA GND	
20				
21				
22				
23	FSD	I	DIGITAL IF SAMDLING CLOCK	
24	AV AB 13	I	AV ADDRESS BUS	
25	AV AB 10	I	AV ADDRESS BUS	
26	AV AD 7	I	AV ADDRESS DATA BUS	
27	AV AD 4	I	AV ADDRESS DATA BUS	
28	AV AD 1	I	AV ADDRESS DATA BUS	
29	AV RD	I	AV READ	
30	ST 0	I	STATUS DATA 0	
31	ST 1	I	STATUS DATA 1	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P004 A' (L2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DV DATA IN 5	I	DIGITAL VIDEO DATA IN	
3	DV DATA IN 2	I	DIGITAL VIDEO DATA IN	
4	DV DATA IN -1	I	DIGITAL VIDEO DATA IN	
5	DV CLK I	I	DIGITAL VIDEO CLOCK	
6	NC.			
7	GND (D)		GND (DIGITAL CIRCUIT)	
8	AV CS		ANALOG VIDEO COMPOSITE SYNC POS	
9	AV CS (NEG)		ANALOG VIDEO COMPOSITE SYNC NEG	
10	AV DATA IN 5	I	ANALOG VIDEO DATA IN (POS)	
11	AV DATA IN 5 (NEG)	I	ANALOG VIDEO DATA IN (NEG)	
12	AV DATA IN 2	I	ANALOG VIDEO DATA IN (POS)	
13	AV DATA IN 2 (NEG)	I	ANALOG VIDEO DATA IN (NEG)	
14	AV CLK I	I	ANALOG VIDEO CLOCK (POS)	
15	AV CLK I (NEG)	I	ANALOG VIDEO CLOCK (NEG)	
16	AV SC	I	ANALOG VIDEO SUB CARRIER (POS)	
17	AV SC (NEG)	I	ANALOG VIDEO SUB CARRIER (NEG)	
18	AV HO		AV H OUT (POS)	
19	AV HO (NEG)		AV H OUT (NEG)	
20	CH0 REC D	O	CH0 REC DATA (POS)	
21	CH0 REC D (NEG)	O	CH0 REC DATA (NEG)	
22	CH0 REC D GND		CH0 REC DATA GND	
23	BYP 9	O	BYPASS 9	
24	BYP 6	O	BYPASS 9	
25	BYP 3	O	BYPASS 9	
26	BYP 0	O	BYPASS 9	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P003 B (L2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)			
3	-12V (A)			
4	GND (A)			
5	MCK	O	AUDIO MASTER CLOCK (POS)	
6	MCK (NEG)	O	AUDIO MASTER CLOCK (NEG)	
7	INCOM REC SW	I	INCOME REC SWITCH	
8	INCOM FN 1	O	INCOME FIELD NO.1	
9	PCON CLK		PITCH CONTROL CLOCK	
10	PCON CLK GND		PITCH CONTROL CLOCK	
11	REF FRM		REFERENCE FRAME	
12	REF VS	I	REFERENCE VERTICAL SYNC	
13	FSA	O	AUDIO SAMPLING CLOCK	
14	INCOM LALT	I	INCOME LINE ALTERNATE	
15	BYP2 2FSC	O	BYPASS 2 2FSC (POS)	
16	BYP2 2FSC (NEG)	O	BYPASS 2 2FSC (NEG)	
17	AU DATA IN 6	I	AUDIO REC DATA	
18	AU DATA IN 3	I	AUDIO REC DATA	
19	AUDATA IN 0	I	AUDIO REC DATA	
20	DBCK	O	AUDIO MASTER CLOCK	
21	AMCK	O	ANALOG AUDIO MASTER CLOCK (POS)	
22	AMCK (NEG)	O	ANALOG AUDIO MASTER CLOCK (NEG)	
23	ABCK	O	ANALOG AUDIO BIT CLOCK	
24	AV AB 14	I	AV ADDRESS BUS	
25	AV AB 11	I	AV ADDRESS BUS	
26	AV AB 8	I	AV ADDRESS BUS	
27	AV AD 5	I	AV ADDRESS DATA BUS	
28	AV AD 2	I	AV ADDRESS DATA BUS	
29	AV ALE	I	AV ADDRESS LOAD ENABLE	
30	AV RESET	I	AV RESET	
31	ST 2	I	STATUS DATA 2	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P004 B' (L2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DV DATA IN 6	I	DIGITAL VIDEO DATA IN 6	
3	DV DATA IN 3	I	DIGITAL VIDEO DATA IN 3	
4	DV DATA IN 0	I	DIGITAL VIDEO DATA IN 0	
5	DV CLK I L	I	DIGITAL VIDEO CLK L	
6	REC COMP SYNC			
7	REC V SYNC			
8	REC H SW			
9	REC H SW GND			
10	AV DATA IN 6	I	ANALOG VIDEO DATA IN 6	
11	AV DATA IN 6 (NEG)	I	ANALOG VIDEO DATA IN 6 (NEG)	
12	AV DATA IN 3	I	ANALOG VIDEO DATA IN 3	
13	AV DATA IN 3 (NEG)	I	ANALOG VIDEO DATA IN 3 (NEG)	
14	AV DATA IN 0	I	ANALOG VIDEO DATA IN 0	
15	AV DATA IN 0 (NEG)	I	ANALOG VIDEO DATA IN 0 (NEG)	
16	AV VS		ANALOG VIDEO V SYNC	
17	AV FRM		ANALOG VIDEO FRAME	
18	FLY ERASE		FLYING ERASE	
19	FV/2		FRAME PULSE	
20	CH1 REC D	O	CH1 REC DATA	
21	CH1 REC D (NEG)	O	CH1 REC DATA LOW	
22	CH1 REC D GND			
23	BYP 10	O	BYPASS 10	
24	BYP 7	O	BYPASS 7	
25	BYP 4	O	BYPASS 4	
26	BYP 1	O	BYPASS 1	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P003 C (L2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)			
2	+12V (A)			
3	-12V (A)			
4	GND (A)			
5	PB RST	I	PLAYBACK RESET	
6	PB FLD	I	PLAYBACK FIELD	
7	PB 5F	I	PLAYBACK LEAP FIELD	
8	INCOM FN 2	O	INCOME FIELD NO.2	
9	REC FNO DL		REC FIELD NO.Ø DELAY	
10	FN Ø		REC FIELD NO.Ø	
11	REC CF		REC COLOR FRAMING	
12	REF CLK	I	REFERENCE CLOCK	
13	REF CLK (NEG)	I	REFERENCE CLOCK (NEG)	
14	INCOM SC		INCOME SUB CARRIER	
15	BYP3 WCK	O	BYPASS 3 WRITE CLOCK	
16	BYP3 WCK (NEG)	O	BYPASS 3 WRITE CLOCK LOW	
17	AU DATA IN 7	I	AUDIO DATA IN	
18	AU DATA IN 4	I	AUDIO DATA IN	
19	AU DATA IN 1	I	AUDIO DATA IN	
20	DBCK L	O	AUDIO MASTER CLOCK LOW	
21	AWCK	O	ANALOG AUDIO WORD CLOCK	
22	FS 128	O	FS* 128	
23	SEL REC SW		SELECT REC SWITCH	
24	AV AB 15	I	AV ADDRESS BUS	
25	AV AB 12	I	AV ADDRESS BUS	
26	AV AB 9	I	AV ADDRESS BUS	
27	AV AD 6	I	AV ADDRESS DATA BUS	
28	AV AD 3	I	AV ADDRESS DATA BUS	
29	AV AD 0	I	AV ADDRESS DATA BUS	
30	AV WR	I	AV WRITE	
31	ST 3	I	STATUS DATA 3	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P004 C' (L2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DV DATA IN 7	I	DIGITAL VIDEO DATA IN 7	
3	DV DATA IN 4	I	DIGITAL VIDEO DATA IN 4	
4	DV DATA IN 1	I	DIGITAL VIDEO DATA IN 1	
5	REF REC SW	I	REFERENCE REC SWITCH	
6	REC VITC			
7	VITC GATE			
8	REC CF	I	REC COLOR FRAMING	
9	EXT CF IN	I	EXTERNAL COLOR FRAME IN	
10	AV DATA IN 7	I	ANALOG VIDEO DATA IN 7	
11	AV DATA IN 7 (NEG)	I	ANALOG VIDEO DATA IN 7 (NEG)	
12	AV DATA IN 4	I	ANALOG VIDEO DATA IN 4	
13	AV DATA IN 4 (NEG)	I	ANALOG VIDEO DATA IN 4 (NEG)	
14	AV DATA IN 1	I	ANALOG VIDEO DATA IN 1	
15	AV DATA IN 1 (NEG)	I	ANALOG VIDEO DATA IN 1 (NEG)	
16	AV LALT	I	AV LINE ALTERNATE	
17	AV CF	I	ANALOG VIDEO CF	
18	CH0 REC	O		
19	CH1 REC	O		
20	REC CLK	I		
21	REC CLK (NEG)	I		
22	REC CLK GND			
23	BYP 11	O	BYPASS 11	
24	BYP 8	O	BYPASS 8	
25	BYP 5	O	BYPASS 5	
26	BYP 2	O	BYPASS 2	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P005 A (L3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5				
6				
7	VALID F	O	VALID FLAG	
8	PB FLD	O	PLAYBACK FIELD	
9	SEGU 0	O	SEGMENT	
10	SEGM VAGUE	O	SEGMENT VAGUE	
11	SYNC + CH0			
12	SYNC - CH0			
13				
14				
15	BYP2 4FSC	I	BYPASS 4FSC	
16	BYP2 4FSC (NEG)	I	BYPASS 4FSC (NEG)	
17	TEST EE 2	I		
18	PB DATA CH0	I		
19	PB CLOCK CH0	I		
20	PB DATA CH1	I		
21	PB CLOCK CH1	I		
22	ENV DET CH0		ENVELOPE DETECT CH0	
23	ENV DET CH1		ENVELOPE DETECT CH1	
24	AV AB 13	I	AV ADDRESS BUS	
25	AV AB 10	I	AV ADDRESS BUS	
26	AV AD 7	I	AV ADDRESS DATA BUS	
27	AV AD 4	I	AV ADDRESS DATA BUS	
28	AV AD 1	I	AV ADDRESS DATA BUS	
29	AV RD	I	AV READ	
30				
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P006 A' (L3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 6	I		
3	PB DATA 3	I		
4	PB DATA 0	I		
5	PB HST		PLAYBACK H START	
6	PB FN 0		PLAYBACK FIELD NO.0	
7	REF HST		REFERENCE H START	
8	REF FN 0		REFERENCE FIELD NO.0	
9	SYS 4FSC	O	SYSTEM 4FSC	
10	SYS 4FSC (NEG)	O	SYSTEM 4FSC (NEG)	
11	AU DATA IN 0	I	AUDIO REC DATA	
12	AU DATA IN 3	I	AUDIO REC DATA	
13	AU DATA IN 6	I	AUDIO REC DATA	
14				
15	PBD 12	O	PLAYBACK DATA CH1/CH2	
16	STO	O	STATUS DATA	
17				
18				
19				
20				
21				
22				
23	BYP 9	I	BYPASS 9	
24	BYP 6	I	BYPASS 6	
25	BYP 3	I	BYPASS 3	
26	BYP 0	I	BYPASS 0	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P005 B (L3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	MCK	I	AUDIO MASTER CLOCK	
6	MCK (NEG)	I	AUDIO MASTER CLOCK (NEG)	
7				
8	MUTE 12	O	MUTE CH1/CH2	
9	SEG - 1	O	SEGMENT 1	
10	PB - FNO		PLAYBACK FIELD NO.	
11	SYNC + CH1			
12	SYNC - CH1			
13	PCON CLK		PITCH CONTROL CLOCK	
14	PCON CLK GND			
15	BYP2 2FSC	I	BYPASS 2 2FSC	
16	BYP2 2FSC (NEG)	I	BYPASS 2 2FSC (NEG)	
17				
18	PB DATA CH0 (NEG)	O		
19	PB CLOCK CH0 (NEG)	O		
20	PB DATA CH1 (NEG)	O		
21	PB CLOCK CH1 (NEG)	O		
22				
23				
24	AV AB 14	I	AV ADDRESS BUS	
25	AV AB 11	I	AV ADDRESS BUS	
26	AV AB 8	I	AV ADDRESS BUS	
27	AV AD 5	I	AV ADDRESS DATA BUS	
28	AV AD 2	I	AV ADDRESS DATA BUS	
29	AV ALE	I	AV ADDRESS LOAD ENABLE	
30	AV RESET	I	AV RESET	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P006 B' (L3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 7	I		
3	PB DATA 4	I		
4	PB DATA 1	I		
5	PB FLDST		PLAYBACK FIELD START	
6	ERR STRB		ERROR STROBE	
7	REF FLDST		REFERENCE FIELD START	
8	REF FN1		REFERENCE FIELD NO.1	
9	SYS 2FSC		SYSTEM 2FSC	
10	SYS 2FSC (NEG)		SYSTEM 2FSC (NEG)	
11	AU DATA IN 1	I	AUDIO REC DATA	
12	AU DATA IN 4	I	AUDIO REC DATA	
13	AU DATA IN 7	I	AUDIO REC DATA	
14				
15	PBD 34	O	PLAYBACK DATA CH3/CH4	
16	ST FLG	O	STATUS ERROR FLAG	
17				
18				
19				
20				
21				
22				
23	BYP 10		BYPASS 10	
24	BYP 7		BYPASS 7	
25	BYP 4		BYPASS 4	
26	BYP 1		BYPASS 1	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P005 C (L3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	PB RST	I	PLAYBACK RESET	
6	PB FN	O	PLAYBACK FIELD NO.0	
7	PB 5F	O	PLAYBACK LEAP FIELD	
8	MUTE 34	O	MUTE CH3/CH4	
9				
10	REC FN 0	O	REC FIELD NO.0	
11				
12	PB TP FRAME		PLAYBACK TAPE FRAME	
13	PB H SW	I		
14				
15	BYP3 WCK	I	BYPASS 3 WRITE CLOCK	
16	BYP 3 WCK (NEG)	I	BYPASS 3 WRITE CLOCK (NEG)	
17				
18	PB DATA CH0 GND			
19	PB CLOCK CH0 GND			
20	PB DATA CH1 GND			
21	PB CLOCK CH1 GND			
22				
23	SEL REC SW	I	SELECT REC SWITCH	
24	AV AB 15	I	AV ADDRESS BUS	
25	AV AB 12	I	AV ADDRESS BUS	
26	AV AB 9	I	AV ADDRESS BUS	
27	AV AD 6	I	AV ADDRESS DATA BUS	
28	AV AD 3	I	AV ADDRESS DATA BUS	
29	AV AD 0	I	AV ADDRESS DATA BUS	
30	AV WR	I	AV WRITE	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P006 C' (L3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB FLAG	O	PLAYBACK FLAG	
3	PB DATA 5	I		
4	PB DATA 2	I		
5	PB CFST		PLAYBACK COLOR FRAME START	
6				
7				
8	REF FN2		REFERENCE FIELD NO.2	
9	REC FNO DL	O	REC FIELD NO.Ø DELAY	
10				
11	AU DATA IN 2	I	AUDIO REC DATA	
12	AU DATA IN 5	I	AUDIO REC DATA	
13	AU DATA GND		AUDIO REC DATA GND	
14				
15				
16	BLK SYNC	O	STATUS SYNC	
17				
18				
19				
20				
21				
22				
23	BYP 11	I	BYPASS 11	
24	BYP 8	I	BYPASS 8	
25	BYP 5	I	BYPASS 5	
26	BYP 2	I	BYPASS 2	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P007 A (L4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2	+12V (A)		+12V (ANALOG CIRCUIT)	
3	-12V (A)		-12V (ANALOG CIRCUIT)	
4	GND (A)		GND (ANALOG CIRCUIT)	
5	+8V (UN)		+8V (UNREGULATED)	
6	-8V (UN)		-8V (UNREGULATED)	
7	INCOM HR	I	INCOME H RESET	
8	INCOM FNO	I	INCOME FIELD NO.0	
9	BYP1 4FSC		BYPASS 1 4FSC	
10	BYP1 4FSC (NEG)		BYPASS 1 4FSC (NEG)	
11	REF HO	O	REFERENCE H OUT	
12	REF CS	O	REFERENCE COMPOSITE SYNC	
13	H RST		H RESET	
14	INCOM CS	I	INCOME COMPOSITE SYNC	
15	FV/2		FRAME PULSE	
16	90Hz/100Hz	I		
17	REF REC SW		REFERENCE REC SWITCH	
18	SPI HO			
19	PB COMP SYNC	O	PLAYBACK COMPOSITE SYNC	
20	REF VIDEO IN	I		
21	REF VIDEO IN GND			
22	BLACK BURST			
23	BLACK BURST GND			
24	AV AB 13	O	AV ADDRESS BUS	
25	AV AB 10	O	AV ADDRESS BUS	
26	AV AD 7	O	AV ADDRESS DATA BUS	
27	AV AD 4	O	AV ADDRESS DATA BUS	
28	AV AD 1	O	AV ADDRESS DATA BUS	
29	AV RD	O	AV READ	
30	AV SYS INT			
31	AV BUSY			
32	GND (D)		GND (DIGITAL CIRCUIT)	

P008 A' (L4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 6	I		
3	PB DATA 3	I		
4	PB DATA 0	I		
5	PB HST	I	PLAYBACK H START	
6	PB FN 0	I	PLAYBACK FIELD NO.0	
7	REF HST	I	REFERENCE H START	
8	REF FN 0	I	REFERENCE FIELD NO.0	
9	SYS 4FSC	O	SYSTEM 4FSC	
10	SYS 4FSC (NEG)	O	SYSTEM 4FSC (NEG)	
11	AV DATA 5	O	ANALOG VIDEO DATA 5	
12	AV DATA 2	O	ANALOG VIDEO DATA 2	
13	AV DATA -1	O	ANALOG VIDEO DATA 1	
14	AV CLK 0		ANALOG VIDEO CLOCK	
15	DV DATA OUT 5	O	DIGITAL VIDEO DATA OUT 5	
16	DV DATA OUT 5 (NEG)	O	DIGITAL VIDEO DATA OUT 5 (NEG)	
17	DV DATA OUT 2	O	DIGITAL VIDEO DATA OUT 2	
18	DV DATA OUT 2 (NEG)	O	DIGITAL VIDEO DATA OUT 2 (NEG)	
19	DV DATA OUT -1	O	DIGITAL VIDEO DATA OUT 1	
20	DV DATA OUT -1 (NEG)	O	DIGITAL VIDEO DATA OUT 1 (NEG)	
21				
22				
23	BYP 9	I	BYPASS 9	
24	BYP 6	I	BYPASS 6	
25	BYP 3	I	BYPASS 3	
26	BYP 0	I	BYPASS 0	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P007 B (L4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2				
3				
4				
5				
6				
7	INCOM REC SW		INCOME REC SWITCH	
8	INCOM FN 1	I	INCOME FIELD NO.1	
9	PCON CLK (4.5M)	I	PITCH CONTROL CLOCK	
10	PCON CLK GND			
11	REF FRM	O	REFERENCE FRAME	
12	REF VS	O	REFERENCE V SYNC	
13				
14	INCOM LALT		INCOME ALTERNATE	
15	FV/4		QUATER FIELD PULSE	
16	CAP FG1			
17				
18	SPI VD			
19	PB VITC			
20	EXT CF IN	I	EXTERNAL COLOR FRAMING IN	
21	EXT CF IN GND			
22	CF PULSE		COLOR FRAME PULSE	
23	CF PULSE GND			
24	AV AB 14	O	AV ADDRESS BUS	
25	AV AB 11	O	AV ADDRESS BUS	
26	AV AB 8	O	AV ADDRESS BUS	
27	AV AD 5	O	AV ADDRESS DATA BUS	
28	AV AD 2	O	AV ADDRESS DATA BUS	
29	AV ALE	O	AV ADDRESS LOAD ENABLE	
30	AV RESET	O	AV RESET	
31	VCP RESET			
32	GND (A)		GND (ANALOG CIRCUIT)	

P008 B' (L4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB DATA 7	I		
3	PB DATA 4	I		
4	PB DATA 1	I		
5	PB FLDST	I	PLAYBACK FIELD START	
6	ERR STRB	I	ERROR STROBE	
7	REF FLDST		REFERENCE FIELD START	
8	REF FN1	I	REFERENCE FIELD NO.1	
9	SYS 2FSC		SYSTEM 2FSC	
10	SYS 2FSC (NEG)		SYSTEM 2FSC (NEG)	
11	AV DATA 6	O	ANALOG VIDEO DATA 6	
12	AV DATA 3	O	ANALOG VIDEO DATA 3	
13	AV DATA 0	O	ANALOG VIDEO DATA 0	
14	AV CLK 0 (NEG)	O	ANALOG VIDEO CLOCK 0 (NEG)	
15	DV DATA OUT 6	O	DIGITAL VIDEO DATA OUT 6	
16	DV DATA OUT 6 (NEG)	O	DIGITAL VIDEO DATA OUT 6 (NEG)	
17	DV DATA OUT 3	O	DIGITAL VIDEO DATA OUT 3	
18	DV DATA OUT 3 (NEG)	O	DIGITAL VIDEO DATA OUT 3 (NEG)	
19	DV DATA OUT 0	O	DIGITAL VIDEO DATA OUT 0	
20	DV DATA OUT 0 (NEG)	O	DIGITAL VIDEO DATA OUT 0 (NEG)	
21	DV CLK 0		DIGITAL VIDEO CLK 0	
22	DV CLK 0 (NEG)		DIGITAL VIDEO CLK 0 (NEG)	
23	BYP 10	I	BYPASS 10	
24	BYP 7	I	BYPASS 7	
25	BYP 4	I	BYPASS 4	
26	BYP 1	I	BYPASS 1	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P007 C (L4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8	INCOM FN2	I	INCOME FIELD NO.2	
9	CMPSY	O	COMPOSITE SYNC	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	REF CF	O	REFERENCE COLOR FRAME	
12	REF CLK	O	REFERENCE CLOCK	
13	REF CLK (NEG)	O	REFERENCE CLOCK (NEG)	
14	INCOM SC	I	INCOME SUB CARRIER	
15	FV/8	O	PAL CF	
16	CAP DIR		CAPSTAN DIRECTION	
17				
18	PB V SYNC	O		
19				
20	TXD			
21	TXD L			
22	RXD			
23	RXD L			
24	AV AB 15	O	AV ADDRESS BUS	
25	AV AB 12	O	AV ADDRESS BUS	
26	AV AB 9	O	AV ADDRESS BUS	
27	AV AD 6	O	AV ADDRESS DATA BUS	
28	AV AD 3	O	AV ADDRESS DATA BUS	
29	AV AD 0	O	AV ADDRESS DATA BUS	
30	AV WR	O	AV WRITE	
31				
32	GND (D)		GND (DIGITAL CIRCUIT)	

P008 C' (L4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PB FLAG			
3	PB DATA 5	I		
4	PB DATA 2	I		
5	PB CFST	I	PLAYBACK COLOR FRAME START	
6				
7				
8	REF FN 2	I	REFERENCE FIELD NO.2	
9	SYNC BLNK		SYNC BLANKING	
10	BURST FLAG			
11	AV DATA 7	O	ANALOG VIDEO DATA 7	
12	AV DATA 4	O	ANALOG VIDEO DATA 4	
13	AV DATA 1	O	ANALOG VIDEO DATA 1	
14	AV DATA -2	O	ANALOG VIDEO DATA 2	
15	DV DATA OUT 7	O	DIGITAL VIDEO DATA OUT 7	
16	DV DATA OUT 7 (NEG)	O	DIGITAL VIDEO DATA OUT 7 (NEG)	
17	DV DATA OUT 4	O	DIGITAL VIDEO DATA OUT 4	
18	DV DATA OUT 4 (NEG)	O	DIGITAL VIDEO DATA OUT 4 (NEG)	
19	DV DATA OUT 1	O	DIGITAL VIDEO DATA OUT 1	
20	DV DATA OUT 1 (NEG)	O	DIGITAL VIDEO DATA OUT 1 (NEG)	
21	DV DATA OUT -2	O	DIGITAL VIDEO DATA OUT 2	
22	DV DATA OUT -2 (NEG)	O	DIGITAL VIDEO DATA OUT 2 (NEG)	
23	BYP 11	I	BYPASS 11	
24	BYP 8	I	BYPASS 8	
25	BYP 5	I	BYPASS 5	
26	BYP 2	I	BYPASS 2	
27	GND (D)		GND (DIGITAL CIRCUIT)	
28	+5V (D)		+5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	-5V (D)		-5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P201 A (S1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	AT CH0 A GND			
5	AT CH0 A	I		
6	AT CH0 B GND			
7	AT CH0 B	I		
8	AT GND			
9				
10				
11				
12	REC DATA GND			
13	REC DATA CH0	I		
14	REC DATA GND			
15	REC DATA CH1	I		
16	REC CLK GND			
17	REC CLK	I		
18	REC CLK GND			
19	CH1 REC	I		
20	TEST EE2	I		
21				
22				
23				
24	REC ENV CH0	O	REC ENVELOPE CH0	
25	GND (A)		GND (ANALOG CIRCUIT)	
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P202 A' (S1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM GND			
2	AT ENV CH0	O	ENVELOPE CH0	
3				
4	EE CH0 DATA GND			
5	EE CH0 DATA	I		
6	EE CH1 DATA GND			
7	EE CH1 DATA	I		
8				
9				
10				
11				
12				
13				
14	ENV DET CH0	O	ENVELOPE DETECT CH0	
15	PB DATA CH0 GND			
16	PB DATA CH0	O		
17	PB CLOCK CH0 GND			
18	PB CLOCK CH0	O		
19				
20	GND (A)		GND (ANALOG CIRCUIT)	
21	PB MODE	I		
22	REC MODE	I		
23	EQ GAIN CH0	I	EQUALIZER GAIN CH0	
24	TEST MODE	I		
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P201 B (S1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	GND (A)		GND (ANALOG CIRCUIT)	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		GND (ANALOG CIRCUIT)	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19				
20				
21	H SW CH1	I	HEAD SWITCH CH1	
22	H SW CH0	I	HEAD SWITCH CH0	
23	SER H SW	I	SERIAL HEAD SWITCH	
24	GND (A)		GND (ANALOG CIRCUIT)	
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P202 B' (S1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (A)		GND (ANALOG CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19	GND (A)		GND (ANALOG CIRCUIT)	
20	GND (A)		GND (ANALOG CIRCUIT)	
21	REC CURR CH1	I	REC CURRENT CH1	
22	REC CURR CH0	I	REC CURRENT CH0	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P201 C (S1)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5	AT CH0 A L	I		
6	AT CH0 A GND			
7	AT CH0 B L	I		
8	AT CH0 B GND			
9				
10				
11				
12	REC DATA GND			
13	REC DATA CH0 L	I		
14	REC DATA GND			
15	REC DATA CH1 L	I		
16	REC DATA GND			
17	REC CLK L	I		
18	REC CLK GND			
19	CH0 REC	I		
20	FLY ERASE	I	FLYING ERASE	
21				
22				
23				
24	REC ENV CH1	O	REC ENVELOPE CH1	
25	GND (A)	O	GND (ANALOG CIRCUIT)	
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P202 C' (S1)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM	O		
2	ENV CH0 GND			
3				
4				
5	EE CH0 DATA L	I		
6	EE CH0 DATA GND			
7	EE CH1 DATA L	I		
8	EE CH1 DATA GND			
9				
10				
11				
12				
13				
14				
15				
16	PB DATA CH0 L	O		
17	PB DATA CH0 GND			
18	PB CLOCK CH0 L	O		
19	PB CLOCK CH0 GND			
20	HT SPEED	I	HEAD TAPE RELATIVE SPEED	
21	RF WFM SELECT 0	I		
22	RF WFM SELECT 1	I		
23	EQ FREQ CH0	I	EQUALIZER FREQUENCY CH0	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P203 A (S2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	AT CH1 A GND			
5	AT CH1 A	I		
6	AT CH1 B GND			
7	AT CH1 B	I		
8	AT CH0 A GND			
9	AT CH0 A	I		
10	AT CH0 B GND			
11	AT CH0 B	I		
12				
13				
14				
15				
16				
17				
18				
19				
20	TEST EE2	I		
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P204 A' (S2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM GND			
2	AT ENV CH1	O	AT ENVELOPE CH1	
3	AT ENV CH0	O	AT ENVELOPE CH0	
4	EE CH1 DATA GND			
5	EE CH1 DATA	I		
6	EE CH0 DATA GND			
7	EE CH0 DATA	I		
8				
9	ENV DET CH0	O	ENVELOPE DETECTER CH0	
10	PB DATA CH0 GND			
11	PB DATA CH0	O		
12	PB CLOCK CH0 GND			
13	PB CLOCK CH0	O		
14	ENV DET CH1	O	ENVELOPE DETECTER CH1	
15	PB DATA CH1 GND			
16	PB DATA CH1	O		
17	PB CLOCK CH1 GND			
18	PB CLOCK CH1	O		
19				
20	GND (A)		GND (ANALOG CIRCUIT)	
21	PB MODE	I		
22				
23	EQ GAIN CH1	I	EQUALIZER GAIN CH1	
24	EQ GAIN CH0	I	EQUALIZER GAIN CH0	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P203 B (S2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4	GND (A)		GND (ANALOG CIRCUIT)	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		GND (ANALOG CIRCUIT)	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19				
20				
21				
22	H SW CH1	I	HEAD SWITCH CH1	
23	H SW CH0	I	HEAD SWITCH CH0	
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P204				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (A)		GND 9ANALOG CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		GND (ANALOG CIRCUIT)	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		GND (ANALOG CIRCUIT)	
17	GND (A)		GND (ANALOG CIRCUIT)	
18	GND (A)		GND (ANALOG CIRCUIT)	
19	GND (A)		GND (ANALOG CIRCUIT)	
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P203 C (S2)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5	AT CH1 A L	I		
6	AT CH1 A GND			
7	AT CH1 B L	I		
8	AT CH1 B GND			
9	AT CH0 A L	I		
10	AT CH0 A GND			
11	AT CH0 B L	I		
12	AT CH0 B GND			
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P204 C' (S2)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	RF WFM	O		
2	ENV CH1 GND			
3	ENV CH0 GND			
4				
5	EE CH1 DATA L	I		
6	EE CH1 DATA GND			
7	EE CH0 DATA L	I		
8	EE CH0 DATA GND			
9				
10	PB DATA CH0 L	O		
11	PB DATA CH0 GND			
12	PB CLOCK CH0 L	O		
13	PB CLOCK CH0 GND			
14				
15				
16	PB DATA CH1 L	O		
17	PB DATA CH1 GND			
18	PB CLOCK CH1 L	O		
19	PB CLOCK CH1 GND			
20	HT SPEED	I	HEAD TAPE RELATIVE SPEED	
21	RF WFM SELECT 0	I		
22	RF WFM SELECT 1	I		
23	EQ FREQ CH1	I	EQUALIZER FREQUENCY CH1	
24	EQ FREQ CH0	I	EQUALIZER FREQUENCY CH0	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCFUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P205 A (S3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2				
3	GND (A)		GND (ANALOG CIRCUIT)	
4	GND (A)		TC R/P HEAD GND	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	REC LTC	I	REC LTC DATA	
20				
21	FULERA L	I	FULL ERASE LOW	
22	CUEERA L	I	CUE ERASE LOW	
23	CUEREC L	I	CUE REC LOW	
24	MUTE L	I	MUTE LOW	
25	REC VR	I	CUE REC VR	
26	SIG MUT	O	SIGNAL MUTE	
27	+24V (UN)		+24V (UNREGULATED)	
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GDN (D)		GND (DIGITAL CIRCUIT)	

P206 A' (S3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		GND (ANALOG CIRCUIT)	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		GND (ANALOG CIRCUIT)	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	GND (A)		CUE IN GND	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	GND (A)		D MIX DATA GND	
17	GND (A)		GND (ANALOG CIRCUIT)	
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P205 B (S3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2				
3	GND (A)		GND (ANALOG CIRCUIT)	
4	TC HEAD -	I/O	TC R/P HEAD C	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	PB LTC	O	PLAYBACK LTC	
20				
21	OSC ON L	I	OSC ON LOW	
22	TCERA L	I	TC ERASE LOW	
23	TCREC L	I	TC REC LOW	
24	ATT 1	I	ATTENUATOR 1	
25	CUE PB VR	I	CUE PLAYBACK VR	
26				
27	+24V (UN)		+24V (UNREGULATED)	
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P206 B' (S3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	GND (A)		GND (ANALOG CIRCUIT)	
7	GND (A)		CUE METER GND	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	GND (A)		CUE OUT GND	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	CUE IN C	I	CUE IN COLD	
14	GND (A)		GND (ANALOG CIRCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	CUE D C	I	D MIX DATA COLD	
17	GND (A)		GND (ANALOG CIRCUIT)	
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (ANALOG CIRCUIT)	
30	+8V (UN)		+8V (ANALOG CIRCUIT)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P205 C (S3)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2				
3	GND (A)		GND (ANALOG CIRCUIT)	
4	TC HEAD +	I/O	TC R/P HEAD H	
5	GND (A)		GND (ANALOG CIRCUIT)	
6	GND (A)		GND (ANALOG CIRCUIT)	
7				
8				
9	RESET	I	SYSTEM RESET	
10				
11				
12				
13				
14				
15				
16				
17				
18				
19	GND (A)		GND (ANALOG CIRCUIT)	
20	X3FOR	I		
21	ERA CHK	O	ERASE CHECK	
22	CTLERA L	I	CTL ERASE LOW	
23	CUE EE	I	CUE EE	
24	ATT 2	I	ATTENUATOR 2	
25	CUE MIX	I	D MIX SELECT	
26				
27	+24V (UN)		+24V (UNREGULATED)	
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P206 C' (S3)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	GND (A)		GND (ANALOG CIRCUIT)	
7	CUE METER	O	CUE METER	
8	GND (A)		GND (ANALOG CIRCUIT)	
9	GND (A)		GND (ANALOG CIRCUIT)	
10	CUE OUT	O	CUE OUT	
11	GND (A)		GND (ANALOG CIRCUIT)	
12	GND (A)		GND (ANALOG CIRCUIT)	
13	CUE IN H	I	CUE IN HOT	
14	GND (A)		GND (ANALOG CITCUIT)	
15	GND (A)		GND (ANALOG CIRCUIT)	
16	CUE D H	I	D MIX DATA HOT	
17	GND (A)		GND (ANALOG CIRCUIT)	
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P207 A (S4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SEG-0	I	SEGMENT-0	
10	PB FN0	I	PLAYBACK FIELD NO.0	
11				
12				
13				
14				
15				
16				
17				
18				
19	STRN B	I	STRAIN B	
20	PAT A G	O	PATTERN A HEAD	
21	PAT B G	O	PATTERN B HEAD	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P208 A' (S4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	ENV CH0	I	ENVELOPE CH0	
3	ENV CH0 GND	I	ENVELOPE CHO GND	
4	ENV CH1	I	ENVELOPE CH1	
5	ENV CH1 GND	I	ENVELOPE CH1 GND	
6				
7				
8				
9				
10	AT 0T DT	O	AT OUT DATA	
11	ADV H SW	I	ADVANCE HEAD SWITCH	
12	ADV H SW GND	I	ADVANCE HEAD SWITCH GND	
13	CAP FB	O	CAPSTAN FEEDBACK	
14	CAP FB G	O	CAPSTAN FEEDBACK GND	
15				
16	CAP F/R	O	CAPSTAN FORWARD/REVERSE	
17				
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P207 B (S4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SEG 1	I	SEGMENT 1	
10	SEG VAG	I	SEGMENT VAGUE	
11				
12				
13				
14				
15	FR GATE	O	FRAME GATE	
16	FV/2	I	FRAME REFERENCE	
17				
18				
19	STRN G	I	STRAIN GND	
20	PAT A	O	PATTERN A	
21	PAT B	O	PATTERN B	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P208 B' (S4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6				
7	AC CTL	I	CTL PULSE	
8				
9				
10	AT IN DT	I	AT IN DATA	
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P207 C (S4)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYNC+CH0	I	OFF TAPE SYNC+CH0	
10	SYNC-CH0	I	OFF TAPE SYNC-CH0	
11				
12	SYNC+CH1	I	OFF TAPE SYNC+CH1	
13	SYNC-CH1	I	OFF TAPE SYNC-CH1	
14				
15				
16				
17				
18				
19	STRN A	I	STRAIN A	
20	HV MONI	I	HIGH VOLTAGE MONITOR	
21	HV ON	O	HIGH VOLTAGE ON	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P208 C' (S4)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6	SER ADR0	I	SERIAL ADDRESS 0	
7	SER ADR1	I	SERIAL ADDRESS 1	
8	SER ADR2	I	SERIAL ADDRESS 2	
9				
10	AT CLK	I	AT CLOCK	
11				
12				
13	CNF H	O	CONFIDENCE HIGH	
14	CAP FG 1	I	CAPSTAN FG 1	
15				
16	CAP FG 2	I	CAPSTAN FG 2	
17				
18	REC ENV CH0	I	REC ENVELOPE CH0	
19	REC ENV CH0 GND	I	REC ENVELOPE CH0 GND	
20	R ENV1	I	REC ENVELOPE CH1	
21	REC ENV CH1 GND	I	REC ENVELOPE CH1 GND	
22	MRST	I	MASTER RESET	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P209 A (S5)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	DRUM FG	I	DRUM FG	
3	PG -	I	DRUM PG -	
4	FG 1	I	CAPSTAN FG 1	
5	TPH 1	I	TAKE UP FG 1	
6	SPH 2	I	SUPPLY FG 2	
7	TEN GND	O	TENSION SENSOR GND	
8	TEN VCC	O	TENSION SENSOR VCC	
9	CTL HE +	I	CONTROL HEAD +	
10	D STOP L	O	DRUM STOP LOW	
11				
12	CAP EDS	O	CAPSTAN FWD/REV/STOP	
13				
14	TERR	O	T-REEL DRIVE ERR	
15				
16	90/100Hz	I	HEAD SWITCH REFERENCE	
17	FV/8	I	CF REFERENCE (PAL)	
18				
19	FVVCC	O	REEL FG SENSOR VCC	
20				
21	DRUM RST	I	DRUM RESET	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P210 A' (S5)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5	A/C CTL	O	CTL PULSE	
6	SER ADAT	I	SERIAL DATA (TO SERVO)	
7	SER BDAT	O	SERIAL DATA (TO SYSCON)	
8	SER CLK	I	SERIAL CLOCK	
9	S FG	O	SUPPLY FG	
10	AT OT DT	I	SERIAL OUTPUT DATA FROM AT	
11	ADV H.SW	O	ADVANCE HEAD SWITCH	
12	ADV H SW GND	O	ADVANCE HEAD SWITCH GND	
13	CAP FB	I	CAPSTAN FEEDBACK (FROM AT)	
14	CAP FB G	I	CAPSTAN FEEDBACK GND	
15				
16	CAP F/R	I	CAPSTAN FOWARD/REVERSE FROM AT	
17				
18	SER H.SW	O	SERIAL HEAD SWITCH	
19	HT SPEED GND	O	HEAD-TAPE RERATIVE SPEED GND	
20				
21				
22	R ENV1	I	REC ENVELOPE CH1	
23	AG (R ENV1 G)	I	REC ENVELOPE CH1 GND	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P209 B (S5)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AG	I	DRUM FG GND	
3	V FG +	O	CAPSTAN FG SENSOR VCC	
4	FG 2	I	CAPSTAN FG 2	
5	TPH 2	I	TAKE UP FG 2	
6				
7	AG (CTL S)	I	ANALOG GND (CTL SHIELD)	
8	S TENTION	I	SUPPLY TENSION	
9	CTL HE -	I	CONTROL HEAD -	
10	D ERR	O	DRUM ERROR	
11	DRUM REF GND	O	DRUM REFERENCE GND	
12	CAP ERR	O	CAPSTAN ERROR	
13	CAP REF GND	O	CAPSTAN REFERENCE GND	
14	SERR	O	S-REEL DRIVE ERROR	
15	FR GATE	I	FRAME GATE	
16	FV/2	I	FRAME REFERENCE	
17	PB FRAME	O	PLAYBACK TAPE FRAME	
18				
19	FG GND (SFG GND)	O	REEL FG SENSOR GND	
20				
21	CAP RST	I	CAPSTAN RESET	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P210 B' (S5)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4	SYS FRM	O	CTL FRAME	
5		O	CTL CF	
6	SER AD 0	I	SERIAL ADDRESS 0	
7	SER AD 1	I	SERIAL ADDRESS 1	
8	SER AD 2	I	SERIAL ADDRESS 2	
9	T-FG	O	TAKE UP FG	
10	AT IN DT	O	SERIAL INPUT DATA TO AT	
11	REC H.SW	O	REC HEAD SWITCH	
12	REC H SW GND	O	REC HEAD SWITCH GND	
13				
14	WFM CTL	O	WAVEFORM CTL	
15	AG (GND A)	O	WAVEFORM CTL GND	
16				
17				
18	SER HSW GND	O	SERIAL HSW GND	
19	REC ENV CH0	I	REC ENVELOPE CH0	
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P209 C (S5)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	PG +	I	DRUM PG +	
3	V FG G	O	CAPSTAN FG SENSOR GND	
4				
5	SPH 1	I	SUPPLY FG 1	
6				
7				
8	PNCH-ON	I	PINCH ON	
9	D BRK L	O	DRUM BRAKE LOW	
10	DRUM ERR GND	O	DRUM ERROR GND	
11	D SW L	O	DRUM SWITCH LOW	
12	CAP ERR GND	O	CAPSTAN ERROR GND	
13	CAP RCC	O	CAPSTAN RIPPLE CANCEL	
14	+2.5VA	O	SERVO REF +2.5[V]	
15				
16	FV/4	I	CF REFERENCE (NTSC)	
17	PB H.SW	O	PLAYBACK HEAD SWITCH	
18				
19	FG GND (TFG GND)	O	REEL FG SENSOR GND	
20				
21	REEL RST	I	REEL RESET	
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P210 C' (S5)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4	3FRM	I	FRAME REFERENCE AT X3 FORMAT	
5	3CF	I	CF REFERENCE AT X3 FORMAT	
6	SER SEL 0	I	SERIAL SELECT 0	
7	SER SEL 1	I	SERIAL SELECT 1	
8	CAP DIR	O	CAPSTAN DIRECTION	
9	CAP FGP	O	CAPSTAN FG PULSE	
10	AT CLK	O	SERIAL CLOCK (TO AT)	
11	CNF H.SW	O	CONFIDENCE HEAD SWITCH	
12	CNF H SW GND	O	CONFIDENCE HEAD SWITCH GND	
13	CNF H	I	CONFIDENCE HIGH	
14	CAP FG1	O	CAPSTAN FG 1	
15				
16	CAP FG2	O	CAPSTAN FG 2	
17				
18	HT SPD	O	HEAD TAPE RELATIVE SPEED	
19	REC ENV CH0 GND	I	REC ENVELOPE CH0 GND	
20				
21				
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P211 A (S6)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYS DB 0	I/O	SYSCON DATA BUS 0	
10	SYS DB 1	I/O	SYSCON DATA BUS 1	
11	SYS DB 2	I/O	SYSCON DATA BUS 2	
12	SYS DB 3	I/O	SYSCON DATA BUS 3	
13	SYS DB 4	I/O	SYSCON DATA BUS 4	
14	SYS DB 5	I/O	SYSCON DATA BUS 5	
15	SYS DB 6	I/O	SYSCON DATA BUS 6	
16	SYS DB 7	I/O	SYSCON DATA BUS 7	
17	TC INT	O	TC INTERUPT	
18				
19				
20				
21	FULL ERASE	O		
22	CUE ERASE	O		
23	CUE REC	O		
24	MUTE	O		
25	CUE REC VR	O		
26	REC LTC	O		
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P212 A' (S6)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	T/C IN +	I		
3	T/C OUT +	O		
4				
5	AC-CTL	I		
6	TRANSMIT A 1	I/O		
7	TRANSMIT B 1	I/O		
8	RECEIVE A 1	I/O		
9	RECEIVE B 1	I/O		
10	TXD	O	RS232C TXD	
11	CTS	I	RS232C CTS	
12	CHAR SIG	O	CHARACTER SIFNAL	
13	SPI HD	I	SUPER INPOSE HP	
14	PB VITC	I		
15	REC CF	I	REC COLOR PRAME	
16	4FSC CLK	I		
17	DIO 1	I/O	GPIB DATA	
18	DIO 4	I/O	GPIB DATA	
19	DIO 7	I/O	GPIB DATA	
20	DAV	I/O	GPIB STATUS	
21	ATN	I/O	GPIB STATUS	
22	REM	I/O	GPIB STATUS	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P211 B (S6)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYS AB 0	I	SYSCON ADDRESS BUS 0	
10	SYS AB 1	I	SYSCON ADDRESS BUS 1	
11	SYS AB 2	I	SYSCON ADDRESS BUS 2	
12	SYS AB 3	I	SYSCON ADDRESS BUS 3	
13	SYS AB 4	I	SYSCON ADDRESS BUS 4	
14	SYS AB 5	I	SYSCON ADDRESS BUS 5	
15	SYS AB 6	I	SYSCON ADDRESS BUS 6	
16	SYS AB 7	I	SYSCON ADDRESS BUS 7	
17	SYS AB 8	I	SYSCON ADDRESS BUS 8	
18	SYS AB 9	I	SYSCON ADDRESS BUS 9	
19	SYS AB 10	I	SYSCON ADDRESS BUS 10	
20				
21	7 OSC ON	O		
22	TC ERASE	O		
23	TC REC	O		
24	ATT 1	O	ATTENUTOR 1	
25	CUE PB VR	O		
26	PB LTC	I		
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P212 B' (S6)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	T/C IN -	I		
3	T/C OUT -	O		
4				
5	SYS FRM	I	SYSTEM FRAME	
6	TRANSMIT A 2	I/O		
7	TRANSMIT B 2	I/O		
8	RECEIVE A 2	I/O		
9	RECEIVE B 2	I/O		
10	RXD	I	RS232C RXD	
11	DSR	I	RS232 DSR	
12	CHAR GATE	O	CHARACTER GATE	
13	SPI VD	I	SUPER INPOSE VD	
14	PB COMP SYNC	I		
15	REC VITC	I		
16	REC COMP SYNC	I		
17	DIO 2	I/O	GPIB DATA	
18	DIO 5	I/O	GPIB DATA	
19	DIO 8	I/O	GPIB DATA	
20	NRFD	I/O	GPIB STATUS	
21	IFC	I/O	GPIB STATUS	
22	EDI	I/O	GPIB STATUS	
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P211 C (S6)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2				
3				
4				
5				
6				
7				
8				
9	SYS RESET	I	SYSCON RESET	
10	SYS IORD	I	SYSCON I/O READ	
11	SYS IOWR	I	SYSCON I/O WRITE	
12	SYS MERD	I	SYSCON MEMORY READ	
13	SYS MEWR	I	SYSCON MEMORY WRITE	
14	SYS BUSY	O	SYSCON BUSY	
15	SYS CS TC	I	SYSCON CHIP SELECT TC	
16	SYS CS REMT	I	SYSCON CHIP SELECT REMOTE	
17	REMT INT	O	REMOTE INTERRUPT	
18				
19				
20				
21	ERASE CHECK	I		
22	CTL ERASE	O		
23	CUE EE	O		
24	ATT 2	O	ATTENUTOR 2	
25	CUE MIX	O		
26				
27				
28	-5V (D)			
29	+5V (D)			
30	+5V (D)			
31	GND (D)			
32	GND (D)			

C' (S6)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	T/C IN GND			
3	T/C OUT GND			
4	X3FRM	O	X3 FORMAT FRAME PULSE	
5	X3CF	O	X3 FORMAT CF PULSE	
6	TRANSMIT A 3	I/O		
7	TRANSMIT B 3	I/O		
8	RECEIVE A 3	I/O		
9	RECEIVE B 3	I/O		
10	RTS	O	REQUEST TO SEND	
11	DTR	O	DATA TERMINAL READY	
12	DCD	I	DATA CARRIER DETECTED	
13				
14	PB V SYNC	I		
15	VITC GATE	I		
16	REC V SYNC	I		
17	DID 3	I/O	GPIB DATA	
18	DID 6	I/O	GPIB DATA	
19		I/O		
20	NDAC	I/O	GPIB STATUS	
21	SRQ	I/O	GPIB STATUS	
22				
23				
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P213 A (S7)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 0	I/O	AV ADDRESS DATA BUS 0	
3	AV AD 3	I/O	AV ADDRESS DATA BUS 3	
4	AV AD 6	I/O	AV ADDRESS DATA BUS 6	
5	AV AD 8	I/O	AV ADDRESS DATA BUS 8	
6	AV AB 11	I	AV ADDRESS BUS 11	
7	AV AB 14	I	AV ADDRESS BUS 14	
8	AV RD	I	AV READ	
9	SYS DB 0	I/O	SYSCON DATA BUS 0	
10	SYS DB 1	I/O	SYSCON DATA BUS 1	
11	SYS DB 2	I/O	SYSCON DATA BUS 2	
12	SYS DB 3	I/O	SYSCON DATA BUS 3	
13	SYS DB 4	I/O	SYSCON DATA BUS 4	
14	SYS DB 5	I/O	SYSCON DATA BUS 5	
15	SYS DB 6	I/O	SYSCON DATA BUS 6	
16	SYS DB 7	I/O	SYSCON DATA BUS 7	
17	TC INT	I		
18	REC V SYNC	I		
19	REC CF	I		
20	AT RST	O	AT RESET	
21	DRUM RST	O	DRUM RESET	
22	MCONT 5	O	MECH CONTROL 5	
23	PINCH ON	O		
24	MCONT 1	O	MECH CONTROL 1	
25	MCONT 2	O	MECH CONTROL 2	
26	T REEL DRV ON	O	T REEL DRIVE ON	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P214 A' (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	F-SER A DATA +	O	FRONT CERIAL A DATA	SYS→FRONT
3	F-SER A DATA -	O		
4	F-SER A EN +	O	FRONT CERIAL A ENEBLE	SYS→FRONT
5	F-SER A EN -	O		
6	S-SER A DATA	O	SERVO SERIAL A DATA	SYS→SERVO
7	S-SER B DATA	I	SERVO SERIAL B DATA	SYS←SERVO
8	S-SER CLK	O	SERVO SERIAL CLOCK	
9	S-FG	I	S-REEL FG	CODER 1
10	CASS DET A	I	CASSETTE DATECTA	
11	S PHOTE	I	SUPPLY PHOTO	
12	T PHOTE	I	TAKE UP PHOTE	
13	SUB LOAD START	I		
14	SUB LOAD END	I		
15	CASS DET F	I	CASSETTE DATECT F	USER C (L)
16	CASS DET R	I	CASSETTE DETECT R	USER C (S,M)
17	CASS DET S	I	CASSETTE DETECT S	USER A (ALL)
18	CASS DET T	I	CASSETTE DETECT T	USER B (V/CTL)
19	SER H SW	I	SERIAL HEAD SWITCH	
20	REC MODE	O		
21	PB MODE	O		
22	REC CURR CH0	O		
23	REC CURR CH1	O		
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P213 B (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 1	I/O	AV ADDRESS DATA BUS 1	
3	AV AD 4	I/O	AV ADDRESS DATA BUS 4	
4	AV AD 7	I/O	AV ADDRESS DATA BUS 7	
5	AV AB 9	I	AV ADDRESS DATA BUS 9	
6	AV AB 12	I	AV ADDRESS DATA BUS 12	
7	AV AB 15	I	AV ADDRESS DATA BUS 15	
8	AV WR	I	AV WRITE	
9	SYS AB 0	O	SYSCON ADDRESS BUS 0	
10	SYS AB 1	O	SYSCON ADDRESS BUS 1	
11	SYS AB 2	O	SYSCON ADDRESS BUS 2	
12	SYS AB 3	O	SYSCON ADDRESS BUS 3	
13	SYS AB 4	O	SYSCON ADDRESS BUS 4	
14	SYS AB 5	O	SYSCON ADDRESS BUS 5	
15	SYS AB 6	O	SYSCON ADDRESS BUS 6	
16	SYS AB 7	O	SYSCON ADDRESS BUS 7	
17	SYS AB 8	O	SYSCON ADDRESS BUS 8	
18	SYS AB 9	O	SYSCON ADDRESS BUS 9	
19	SYS AB 10	O	SYSCON ADDRESS BUS 10	
20	VCP RESET	O	AV CPU RESET	
21	CAP RST	O	CAPSTAN RESET	
22	MCONT 6	O	MECH CONTROL 6	
23	S BAK ON	O	SUPPLY BRAKE ON	
24	STP ON	O	STOP ON	
25	MCONT 3	O	MECH CONTROL 3	
26	S REEL DRV ON	O	SUPPLY REEL DRIVE ON	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P214 B' (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1		I		
2	F-SER B DATA +	I	FRONT SERIAL B DATA	FRONT→SYS
3	F-SER B DATA -	I		
4	F-SER B EN +	I	FRONT SERIAL B ENABLE	FRONT→SYS
5	F-SER B EN -	I		
6	SER ADR0	O	SERVO SERIAL ADDRESS	DATA ADDRESS
7	SER ADR1	O		
8	SER ADR2	O		
9	T-FG	I	T-REEL FG	
10	CASS DET B	I	CASSETTE DETECT B	CODER 2
11	CASS IN SW L	I	CASSETTE IN SWITCH LEFT	
12	CASS UP SW	I	CASSETTE UP SWITCH	
13	L CASS IN	I	L CASSETTE IN	
14	MAIN LOAD START	I		
15	MAIN LOAD END	I		
16	MAIN LOAD CENTER	I		
17	SENS LED A	O	SENSOR LED A	
18	SENS LED K	O	SENSOR LED K	
19	AUTO OFF LAMP	O		
20	SUB LOAD CEN	I	SUB LOADING CENTER	
21	TEST MODE	O		
22	EQ GAIN CH0	O	EQUALIZER GAIN CH0	
23	EQ GAIN CH1	O	EQUALIZER GAIN CH1	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P213 C (S7)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 2	I/O	AV ADDRESS DATA BUS 2	
3	AV AD 5	I/O	AV ADDRESS DATA BUS 5	
4	AV ALE	I		
5	AV AB 10	I	AV ADDRESS BUS 10	
6	AV AB 13	I	AV ADDRESS BUS 13	
7	AV SYS INT	O	AV SYSCON INTERRUPT	
8	AV BUSY	O		
9	SYS RESET	O		
10	SYS IORD	O	SYSCON IO READ	
11	SYS IOWR	O	SYSCON IO WRITE	
12	SYS MERD	O	SYSCON MEMORY READ	
13	SYS MEWR	O	SYSCON MEMORY WRITE	
14	SYS BUSY	I	SYSCON BUSY	
15	SYS CS TC	O	SYSCON CHIP SELECT TC	
16	SYS CS REMT	O	SYSCON CHIP SELECT REMOTE	
17	REMT INT	I	REMOTE INTERRUPT	
18				
19				
20				
21	REEL RST	O	REEL RESET	
22	MCONT 7	O	MECH CONTROL 7	
23	T BAK ON	O	TAKE UP BRAKE ON	
24	CLEAN ON	O		
25	MCONT 4	O	MECH CONTROL 4	
26	MCONT 8	O	MECH CONTROL 8	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P214 C' (S7)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1		O		
2	F-SER STB +	O	FRONT SERIAL STROBE	
3	F-SER STB -	O		
4	F-SER CLK +	O	FRONT SERIAL CLOCK	
5	F-SER CLK -	O		
6	S-SER SEL 0	O	SERVO SERIAL SELECT	CPU SELECT
7	S-SER SEL 1	O		
8	CAP DIR	I	CAPSTAN DIRECTION	
9	CAP FGP	I	CAPSTAN FG PULSE	
10	CASS DET C	I	CASSETTE DETECT C	CODER 3
11	CASS IN SW R	I	CASSETTE IN SW RIGHT	
12	CASS DOWN SW	I	CASSETTE DOWN SWITCH	
13	M CASS IN	I	M CASSETTE IN	
14	REEL POS FRONT	I	REEL POSITION FRONT	
15	REEL POS CENTER	I	REEL POSITION CENTER	
16	REEL POS BACK	I	REEL POSITION BACK	
17	DEW SENS	I	DEW SENSOR	
18	EJECT KEY	I		
19	EJECT LAMP	O		
20	RF WFM SELECT 0	O		
21	RF WFM SELECT 1	O		
22	EQ FREQ CH 0	O	EQUALIZER FREQUENCY CH0	
23	EQ FREQ CH 1	O	EQUALIZER FREQUENCY CH1	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P215 A (S8)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 0	I	AV ADDRESS DATA BUS 0	
3	AV AD 3	I	AV ADDRESS DATA BUS 3	
4	AV AD 6	I	AV ADDRESS DATA BUS 6	
5	AV AB 8	I	AV ADDRESS BUS 8	
6	AV AB 11	I	AV ADDRESS BUS 11	
7	AV AB 14	I	AV ADDRESS BUS 14	
8	AV RD	I	AV READ	
9	AV RESET	I	AV RESET	
10				
11				
12	ASD 1	I	ANALOG AUDIO INPUT CH1/CH2	
13				
14	DSD 1	O	PLAYBACK DATA OUTPUT CH1/CH2	
15				
16	PBD 1 2	I	PLAYBACK DATA CH1/CH2	
17	STO	I	STATUS DATA	
18				
19				
20	MUTE 1 2	I	MUTE CH1/CH2	
21				
22	VALIDF	I	VALID FLAG	
23				
24	AU DATA IN 0	O	AUDIO REC DATA	
25	AU DATA IN 3	O	AUDIO REC DATA	
26	AU DATA IN 6	O	AUDIO REC DATA	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P216 A' (S8)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	PB RST	I	PLAYBACK RESET	
3				
4	DBCK L	I	AUDIO MASTER CLOCK LOW	
5	NC.			
6	ST 0	O	STATUS DATA 0	
7	NC.			
8	FSA	I	AUDIO SAMPLING CLOCK	
9				
10				
11				
12				
13				
14				
15				
16	NC.			
17				
18	DAI 1A	I	DIGITAL AUDIO INPUT 1A	
19	DAI 2A	I	DIGITAL AUDIO INPUT 2A	
20	DAO 1A	O	DIGITAL AUDIO OUTPUT 1A	
21	DAO 2A	O	DIGITAL AUDIO OUTPUT 2A	
22	VA CNT 1A	O	VA CONTROL 1A	
23	VA CNT 2A	O	VA CONTROL 2A	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P215 B (S8)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2	AV AD 1	I	AV ADDRESS DATA BUS 1	
3	AV AD 4	I	AV ADDRESS DATA BUS 4	
4	AV AD 7	I	AV ADDRESS DATA BUS 7	
5	AV AB 9	I	AV ADDRESS BUS 9	
6	AV AB 12	I	AV ADDRESS BUS 12	
7	AV AB 15	I	AV ADDRESS BUS 15	
8	AV WR	I	AV WRITE	
9				
10				
11				
12				
13				
14				
15	DSD L	O	PLAYBACK DATA OUTPUT L/R	
16	PBD 34	I	PLAYBACK DATA CH3/CH4	
17	STFLG	I	STATUS ERROR FLAG	
18				
19				
20	MUTE 3 4	I	MUTE CH3/CH4	
21				
22	PB5F	I	PLAYBACK LEAP FIELD	
23				
24	AU DATA IN 1	O	AUDIO REC DATA	
25	AU DATA IN 4	O	AUDIO REC DATA	
26	AU DATA IN 7	O	AUDIO REC DATA	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P216 B' (S8)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	NC.			
3				
4	DBCK	I	AUDIO MASTER CLOCK	
5	NC.			
6	ST 1	O	STATUS DATA 1	
7	FSD	O	DIGITAL IF SAMPLING CLOCK	
8				
9				
10				
11	NC.			
12				
13				
14				
15				
16	CUE D C	O	D MIX DATA COLD	
17				
18	DAI 1B	I	DIGITAL AUDIO INPUT 1B	
19	DAI 2B	I	DIGITAL AUDIO INPUT 2B	
20	DAO 1B	O	DIGITAL AUDIO OUTPUT 1B	
21	DAO 2B	O	DIGITAL AUDIO OUTPUT 2B	
22	VA CNT 1B	O	VA CONTROL 1B	
23	VA CNT 2B	O	VA CONTROL 2B	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P215 C (S8)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	NC.			
2	AV AD 2	I	AV ADDRESS DATA BUS 2	
3	AV AD 5	I	AV ADDRESS DATA BUS 5	
4	AV ALE	I	AV ADDRESS LOAD ENABLE	
5	AV AB 10	I	AV ADDRESS BUS 10	
6	AV AB 13	I	AV ADDRESS BUS 13	
7				
8				
9				
10				
11				
12	ASD 3	I	ANALOG AUDIO INPUT CH3/CH4	
13				
14	DSD 3	O	PLAYBACK DATA OUTPUT CH3/CH4	
15				
16				
17	BLK SYNC	I	STATUS SYNC	
18				
19				
20				
21				
22	PB FLD	I	PLAYBACK FIELD	
23				
24	AU DATA IN 2	O	AUDIO REC DATA	
25	AU DATA IN 5	O	AUDIO REC DATA	
26	AU DATA IN GND		AUDIO REC DATA GND	
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P216 C' (S8)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2	DIF CK	O	DIGITAL INTERFACE CLOCK	
3	DIF CK L	O	DIGITAL INTERFACE CLOCK LOW	
4				
5				
6	ST 2	O	STATUS DATA 2	
7				
8	NC.			
9	NC.			
10				
11	CUE METER	I	CUE METER	
12				
13				
14				
15				
16	CUE D H	O	D MIX DATA HOT	
17				
18	DAI 1 GND		DIGITAL AUDIO INPUT 1 GND	
19	DAI 2 GND		DIGITAL AUDIO INPUT 2 GND	
20	DAO 1 GND		DIGITAL AUDIO OUTPUT 1 GND	
21	DAO 2 GND		DIGITAL AUDIO OUTPUT 2 GND	
22	VA CNT 1 GND		VA CONTROL 1 GND	
23	VA CNT 2 GND		VA CONTROL 2 GND	
24				
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P217 A (S9)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 0		AV ADDRESS DATA BUS 0	
3	AV AD 3		AV ADDRESS DATA BUS 3	
4	AV AD 6		AV ADDRESS DATA BUS 6	
5	AV AB 8		AV ADDRESS BUS 8	
6	AV AB 11		AV ADDRESS BUS 11	
7	AV AB 14		AV ADDRESS BUS 14	
8	AV RD		AV READ	
9	AV RESET			
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P218 A' (S9)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3	AV VS		AV V SYNC	
4	AV CS		AV COMPOSITE SYNC	
5	AV SC		AV SUB CARRIER	
6	AV LALT		AV ALTERNATE	
7	AV FRM		AV FRAME	
8	AV CF		AV COLOR FRAME	
9	AV HO		AV H OUT	
10	AV CLK			
11				
12	AV DATA 0			
13	AV DATA 1			
14	AV DATA 2			
15	AV DATA 3			
16	AV DATA 4			
17	AV DATA 5			
18	AV DATA 6			
19	AV DATA 7			
20				
21				
22				
23	GND (A)		GND (ANALOG CIRCUIT)	
24	+5V (A)		+5V (ANALOG CIRCUIT)	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P217 B (S9)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 1		AV ADDRESS DATA BUS 1	
3	AV AD 4		AV ADDRESS DATA BUS 4	
4	AV AD 7		AV ADDRESS DATA BUS 7	
5	AV AB 9		AV ADDRESS BUS 9	
6	AV AB 12		AV ADDRESS BUS 12	
7	AV AB 15		AV ADDRESS BUS 15	
8	AV WR		AV WRITE READ	
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P218 B' (S9)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4	AV CS L		ANALOG VIDEO COMP SYNC L	
5	AV SC L		ANALOG VIDEO SUB CARRIER L	
6				
7				
8				
9	AV HO L		AV H OUT L	
10	AV CLK L		ANALOG VIDEO CLK L	
11				
12	AV DATA 0 L			
13	AV DATA 1 L			
14	AV DATA 2 L			
15	AV DATA 3 L			
16	AV DATA 4 L			
17	AV DATA 5 L			
18	AV DATA 6 L			
19	AV DATA 7 L			
20				
21	REC INPUT VIDEO GND			
22				
23	GND (A)		GND (ANALOG CIRCUIT)	
24	+5V (A)		+5V (ANALOG CIRCUIT)	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V 9UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

P217 C (S9)				
NO.	PIN NAME	I/O	FUNCTION	REMARKS
1	GND (D)		GND (DIGITAL CIRCUIT)	
2	AV AD 2		AV ADDRESS DATA BUS 2	
3	AV AD 5		AV ADDRESS DATA BUS 5	
4	AV ALE		AV ADDRES LOAD ENABLE	
5	AV AB 10		AV ADDRESS BUS 10	
6	AV AB 13		AV ADDRESS BUS 13	
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28	-5V (D)		-5V (DIGITAL CIRCUIT)	
29	+5V (D)		+5V (DIGITAL CIRCUIT)	
30	+5V (D)		+5V (DIGITAL CIRCUIT)	
31	GND (D)		GND (DIGITAL CIRCUIT)	
32	GND (D)		GND (DIGITAL CIRCUIT)	

P218 C' (S9)				
NO.	PIN NAME	I/O	DESCRIPTION	REMARKS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21	REC INPUT VIDEO			
22				
23	GND (A)		GND (ANALOG CIRCUIT)	
24	+5V (A)		+5V (ANALOG CIRCUIT)	
25	-5V (A)		-5V (ANALOG CIRCUIT)	
26	+5V (A)		+5V (ANALOG CIRCUIT)	
27	-12V (A)		-12V (ANALOG CIRCUIT)	
28	+12V (A)		+12V (ANALOG CIRCUIT)	
29	+15V (UN)		+15V (UNREGULATED)	
30	+8V (UN)		+8V (UNREGULATED)	
31	GND (A)		GND (ANALOG CIRCUIT)	
32	GND (A)		GND (ANALOG CIRCUIT)	

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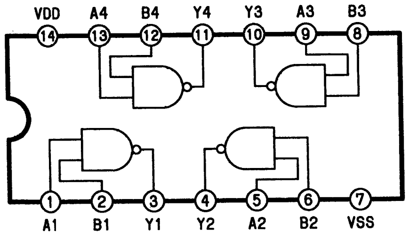
NOTE: The following ICs which are not described on the REF. PAGE, are not contained the IC Block drawing in this issue.

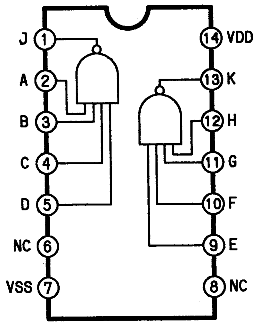
4011
(QUAD 2-INPUT NAND GATE)

(TOP VIEW)

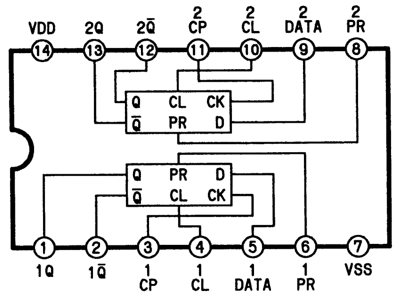


4012
(DUAL 4-INPUT NAND GATE)

(TOP VIEW)



4013
(DUAL D-TYPE FLIP-FLOP)



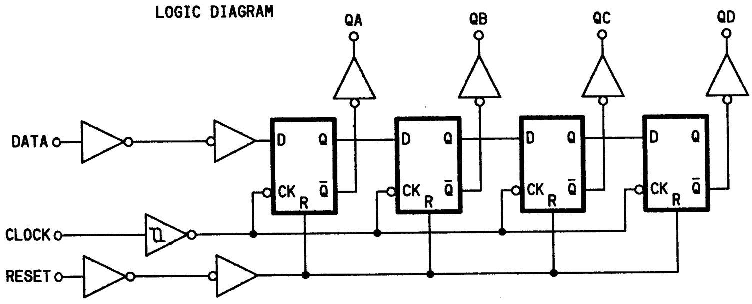
TRUTH TABLE

INPUTS				OUTPUTS		
CLOCK†	DATA	RESET	SET	Q	Q̄	
↑	0	0	0	0	1	
↑	1	0	0	1	0	
↓	×	0	0	Q	Q̄	NO CHANGE
×	×	1	0	0	1	
×	×	0	1	1	0	
×	×	1	1	1	1	

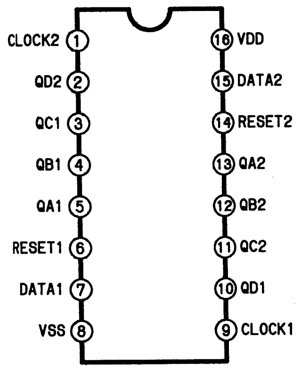
X=DON'T CARE
†=LEVEL CHANGE

4015
(DUAL 4-STAGE SHIFT REGISTER)

LOGIC DIAGRAM



(TOP VIEW)



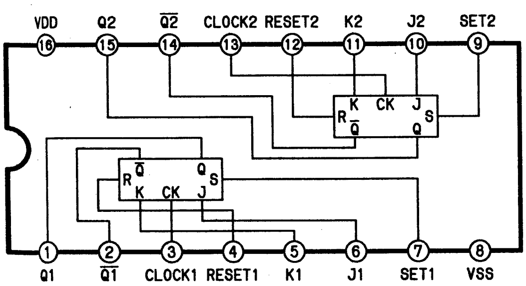
TRUTH TABLE

CL▲	D	R	Q1	QN
↑	0	0	0	QN-1
↑	1	0	1	QN-1
↓	×	0	Q1	QN (NO CHANGE)
×	×	1	0	0

▲ LEVEL CHANGE
× DON'T CARE CASE

4027
(DUAL J-K MASTER-SLAVE FLIP-FLOP)

(TOP VIEW)

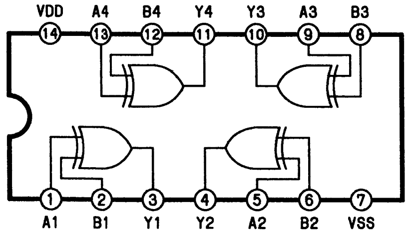


TRUTH TABLE

INPUT					OUTPUT	
C	J	K	S	R	QN+1	Q̄N+1
↑	L	L	L	L	QN	Q̄N
↑	L	H	L	L	L	H
↑	H	L	L	L	H	L
↑	H	H	L	L	Q̄N	QN
↓	×	×	L	L	QN	Q̄N
×	×	×	L	H	L	H
×	×	×	H	L	H	L
×	×	×	H	H	H	H

×= DON'T CARE CASE

4030
(QUAD EXCLUSIVE OR GATE)
(TOP VIEW)

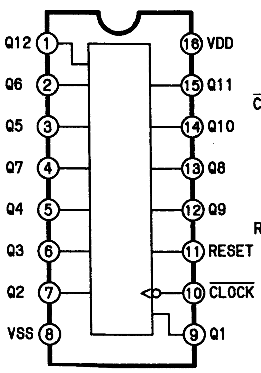


TRUTH TABLE

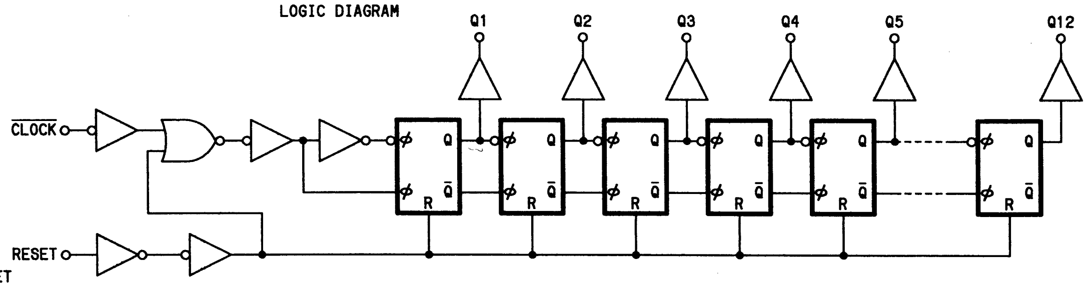
A	B	Y
L	L	L
H	L	H
L	H	H
H	H	L

4040
(12-STAGE RIPPLE CARRY BINARY COUNTER/DIVIDER)

(TOP VIEW)



LOGIC DIAGRAM



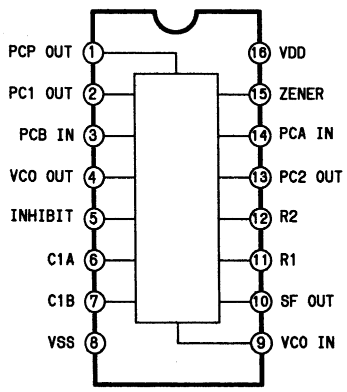
TRUTH TABLE

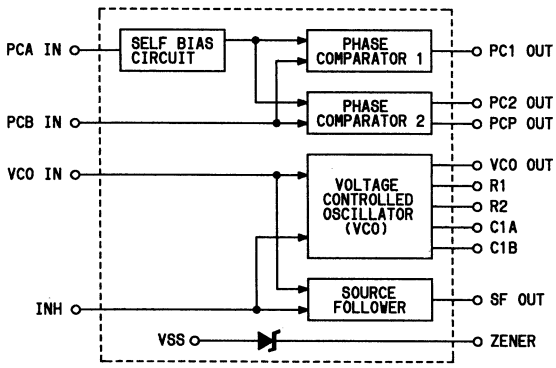
CLOCK	RESET	QN OUT
×	H	L
⟋	L	NO COUNT
⟍	L	BI COUNT

×: H or L

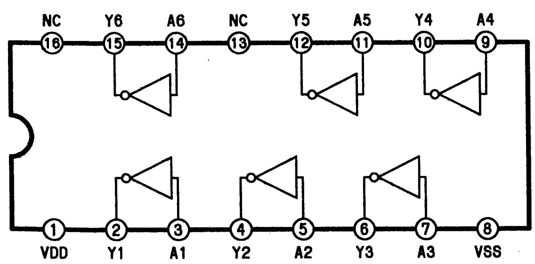
4046
(PHASE-LOCKED LOOP)

(TOP VIEW)

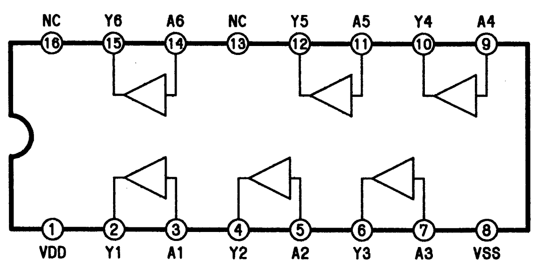




4049
(HEX.INVERTING BUFFER/CONVERTER)
(TOP VIEW)

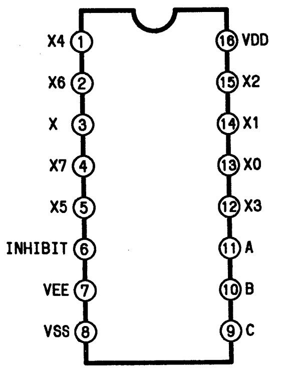


4050
(HEX.BUFFER/CONVERTER)
(TOP VIEW)



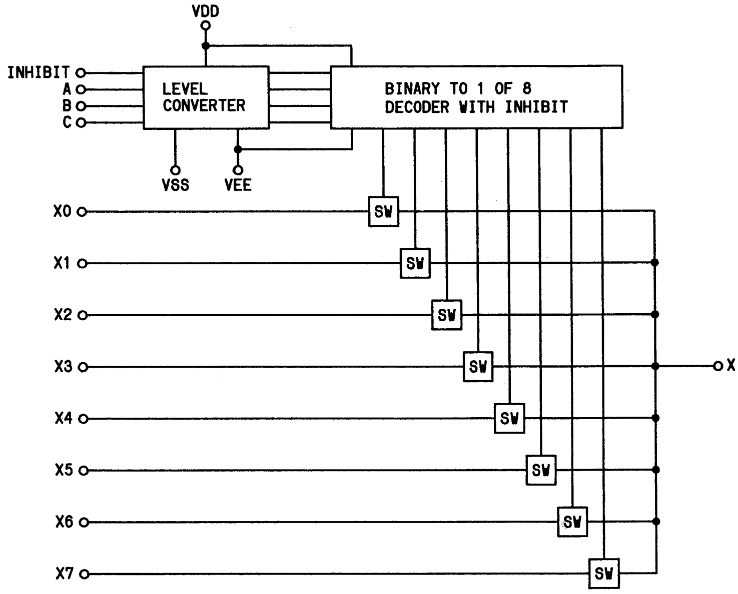
4051
(SINGLE 8-CHANNEL MULTIPLEXER/DEMULTIPLEXER)

(TOP VIEW)



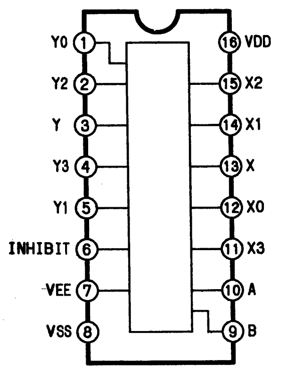
TRUTH TABLE

INPUT STATES				"ON"CHANNEL(S)
INHIBIT	C	B	A	
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	×	×	×	NONE



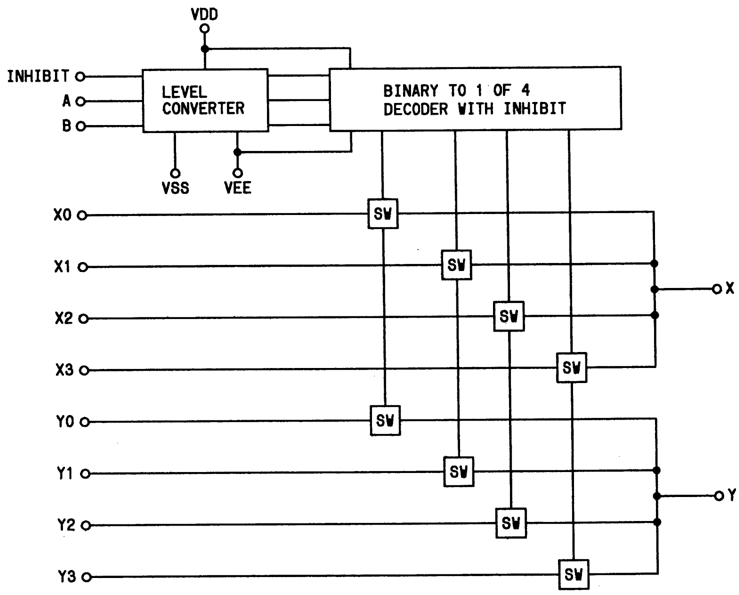
4052
(DIFFERENTIAL 4-CHANNEL MULTIPLEXER/DEMULTIPLEXER)

(TOP VIEW)



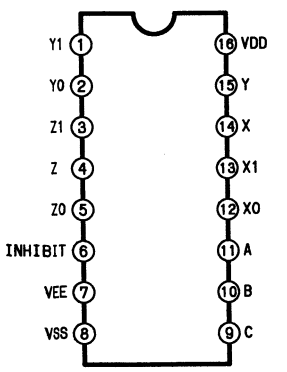
TRUTH TABLE

INPUT STATES			"ON"CHANNEL(S)
INHIBIT	B	A	
0	0	0	X0.Y0
0	0	1	X1.Y1
0	1	0	X2.Y2
0	1	1	X3.Y3
1	×	×	NONE



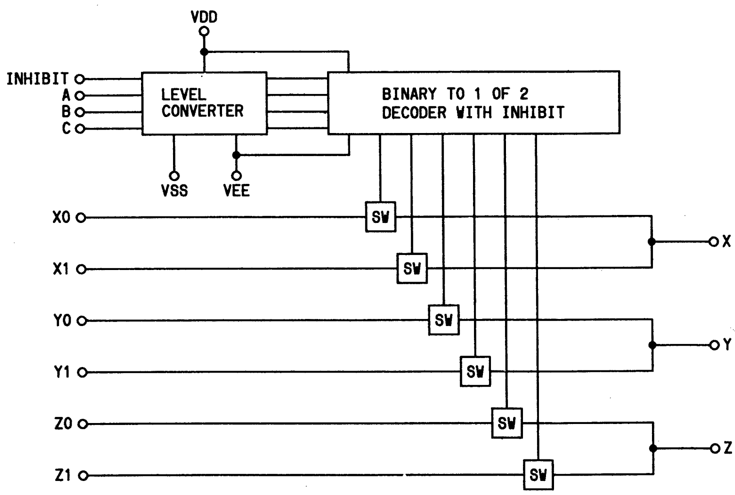
4053
(TRIPLE 2-CHANNEL MULTIPLEXER/DEMULTIPLEXER)

(TOP VIEW)



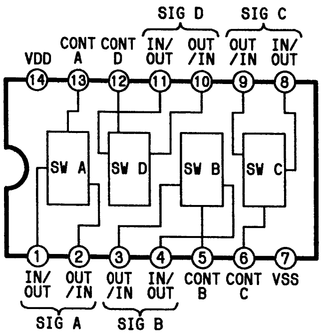
TRUTH TABLE

INPUT STATES				"ON"CHANNEL(S)
INHIBIT	C	B	A	
0	0	0	0	X0.Y0.Z0
0	0	0	1	X1.Y1.Z1
1	×	×	×	NONE



4066
(QUAD BILATERAL SWITCH)

(TOP VIEW)

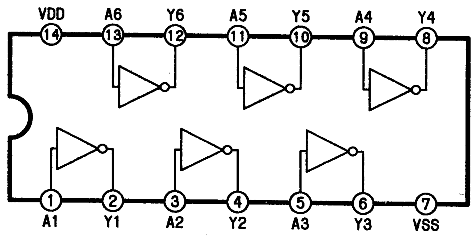


TRUTH TABLE

CONTROL	SWITCH
H	ON
L	OFF

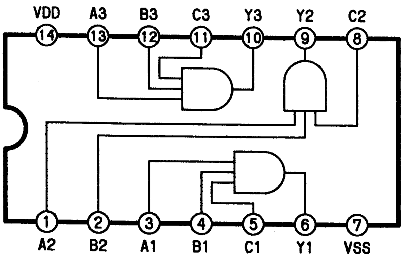
4069
(HEX. INVERTER)

(TOP VIEW)



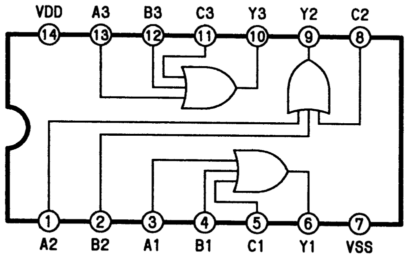
4073
(TRIPLE 3-INPUT AND GATE)

(TOP VIEW)



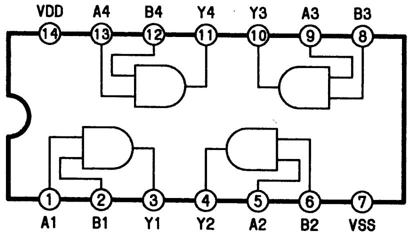
4075
(TRIPLE 3-INPUT OR GATE)

(TOP VIEW)



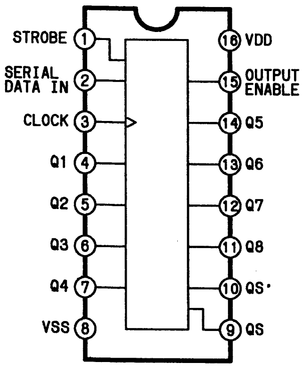
4081
(QUAD 2-INPUT AND GATE)

(TOP VIEW)

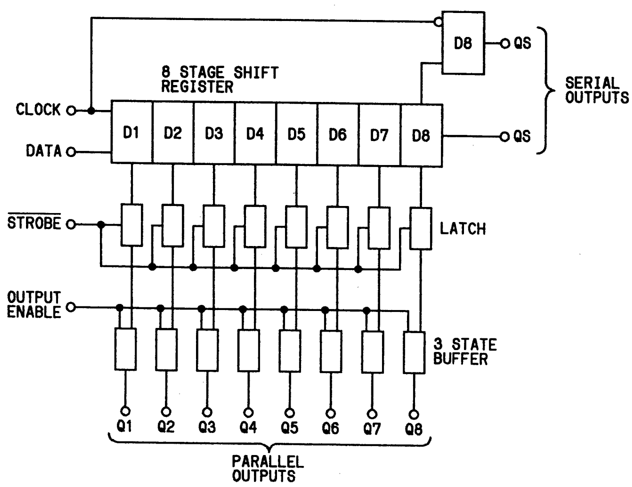


4094
(8-STAGE SHIFT/STORE BUS REGISTER)

(TOP VIEW)



BLOCK DIAGRAM



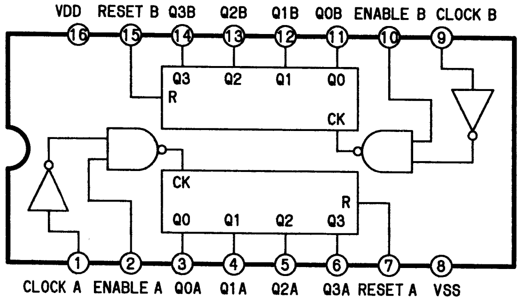
TRUTH TABLE

CL▲	OUTPUT ENABLE	STROBE	DATA	PARALLEL OUTPUTS Q1	PARALLEL OUTPUTS QN	SERIAL OUTPUTS QS	SERIAL OUTPUTS Q'S
↑	0	×	×	OC	OC	Q7	NC
↓	0	×	×	OC	OC	NC	Q7
↑	1	0	×	NC	NC	Q7	NC
↑	1	1	0	0	QN-1	Q7	NC
↑	1	1	1	1	QN-1	Q7	NC
↓	1	1	1	NC	NC	NC	Q7

▲-LEVEL CHANGE ×-DON'T CARE CASE

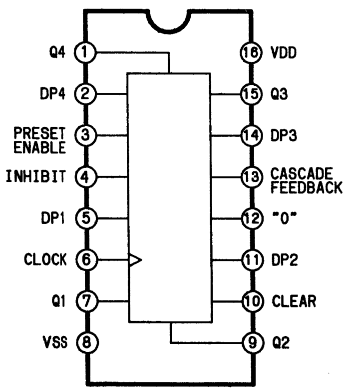
4520
(DUAL BINARY UP COUNTER)

(TOP VIEW)



4526
(PROGRAMMABLE DIVIDE-BY-N 4-BIT COUNTER)

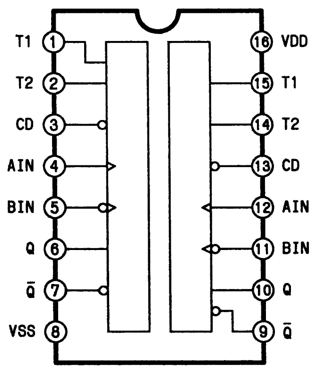
(TOP VIEW)



CLOCK	INHIBIT	PRESET ENABLE	MASTER RESET	ACTION
0	0	0	0	NO COUNT
↑	0	0	0	COUNT1
X	1	0	0	NO COUNT
1	↓	0	0	COUNT1
X	X	1	0	PRESET
X	X	X	1	RESET

4528
(DUAL MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)

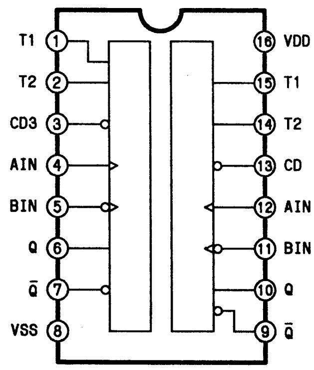


TRUTH TABLE

INPUT			OUTPUT	
A	B	CD	Q	$\overline{Q}$
↑	H	H	⊓	⊔
↑	L	H	Q	$\overline{Q}$
H	↓	H	Q	$\overline{Q}$
L	↓	H	⊓	⊔
X	X	L	L	H

4538
(DUAL PRECISION MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)

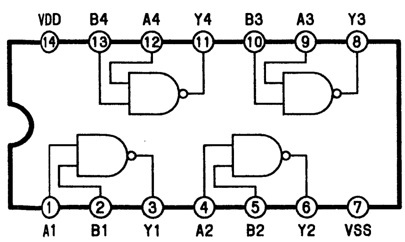


TRUTH TABLE

INPUT			OUTPUT	
A	$\overline{B}$	$\overline{CD}$	Q	$\overline{Q}$
↑	H	H	⊓	⊔
↑	L	H	Q	$\overline{Q}$
H	↓	H	Q	$\overline{Q}$
L	↓	H	⊓	⊔
X	X	L	L	H

7400
(QUAD 2-INPUT NAND GATE)

(TOP VIEW)

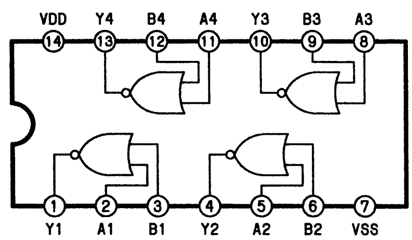


TRUTH TABLE (74HC)

INPUTS		OUTPUTS
A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

7402
(QUAD 2-INPUT NOR GATE)

(TOP VIEW)

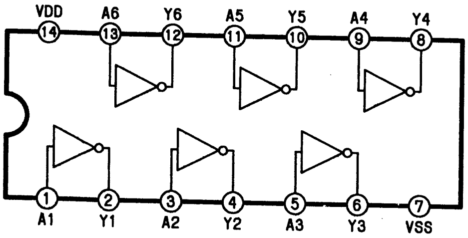


TRUTH TABLE

INPUTS		OUTPUTS
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

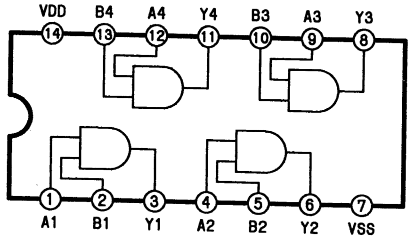
7404
(HEX.INVERTER)

(TOP VIEW)



7408
(QUAD 2-INPUT AND GATE)

(TOP VIEW)

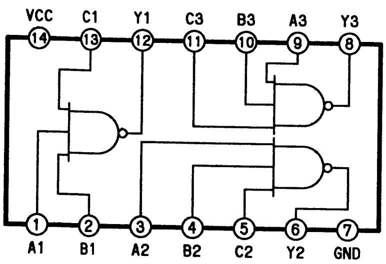


TRUTH TABLE

INPUTS		OUTPUTS
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

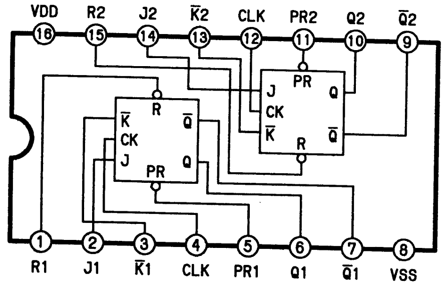
7410
(TRIPLE 3-INPUT POSITIVE-NAND GATES)

(TOP VIEW)



POSITIVE LOGIC:
$Y=\overline{ABC}$

74109
(DUAL J-K FLIP-FLOP WITH PRESET AND CLEAR)



TRUTH TABLE (74HC109)

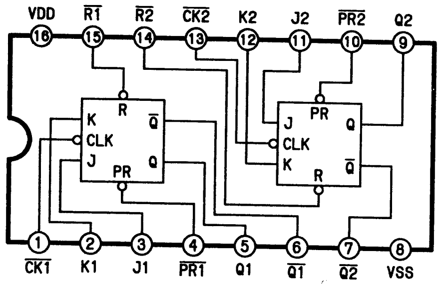
INPUTS					OUTPUTS	
PR	CLR	CLK	J	$\overline{K}$	Q	$\overline{Q}$
L	H	×	×	×	H	L
H	L	×	×	×	L	H
L	L	×	×	×	H*	H*
H	H	↑	L	L	L	H
H	H	↑	H	L	TOGGLE	
H	H	↑	L	H	Q0	$\overline{Q0}$
H	H	↑	H	H	H	L
H	H	L	×	×	Q0	$\overline{Q0}$

* :UNSTABLE

CLK:CLOCK
$\overline{PR}$:$\overline{PRESET}$
$\overline{R}$:$\overline{RESET}$

74112
(DUAL J-K FLIP-FLOP WITH PRESET AND CLEAR)

(TOP VIEW)



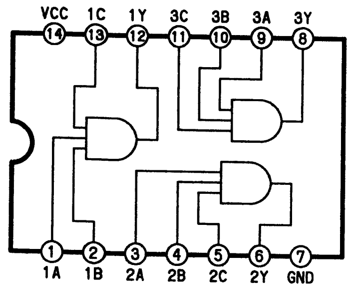
TRUTH TABLE (74HC112)

INPUTS					OUTPUTS	
PR	CLR	CLK	J	L	Q	$\overline{Q}$
L	H	×	×	×	H	L
H	L	×	×	×	L	H
L	L	×	×	×	L*	L*
H	H	↓	L	L	Q0	$\overline{Q0}$
H	H	↓	H	L	H	L
H	H	↓	L	H	L	H
H	H	↓	H	H	TOGGLE	
H	H	H	×	×	Q0	$\overline{Q0}$

* :UNSTABLE

CLK:CLOCK
$\overline{PR}$:$\overline{PRESET}$
$\overline{R}$:$\overline{RESET}$

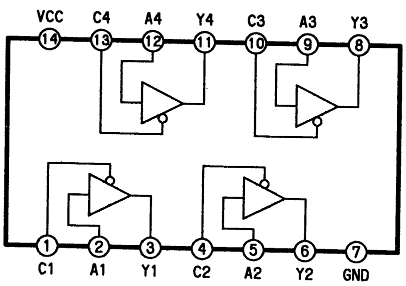
7411
(TRIPLE 3-INPUT AND GATE)



Y=A.B.C

74125
(3 STATE QUAD BUFFER)

(TOP VIEW)

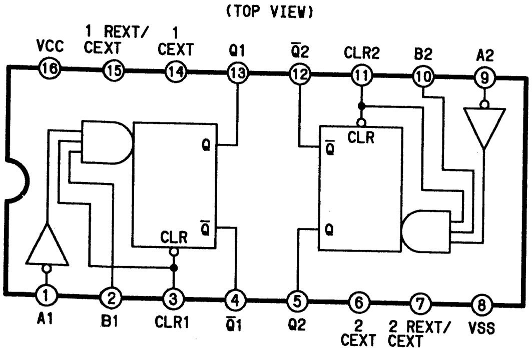


TRUTH TABLE

INPUTS		OUTPUT
A	C	Y
H	L	H
L	L	L
X	H	Z

74123
(DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)



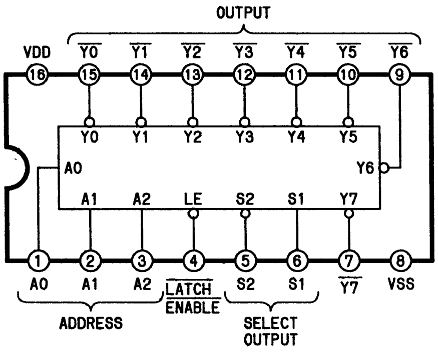
TRUTH TABLE

INPUTS			OUTPUTS	
CLEAR	A	B	Q	$\overline{Q}$
L	×	×	L	H
×	H	×	L	H
×	×	L	L	H
H	L	↑	⊓	⊔
H	↓	H	⊓	⊔
↑	L	H	⊓	⊔

74137
74237

(3-8 LINE DECODERS)

(TOP VIEW)



TRUTH TABLE

INPUT						OUTPUT							
$\overline{\text{LATCH}}$ ENABLE	SELECT S1	SELECT $\overline{S2}$	ADDRESS A2	ADDRESS A1	ADDRESS A0	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
X	X	H	X	X	X	H	H	H	H	H	H	H	H
X	L	X	X	X	X	H	H	H	H	H	H	H	H
L	H	L	L	L	L	L	H	H	H	H	H	H	H
L	H	L	L	L	H	H	L	H	H	H	H	H	H
L	H	L	L	H	L	H	H	L	H	H	H	H	H
L	H	L	L	H	H	H	H	H	L	H	H	H	H
L	H	L	H	L	L	H	H	H	H	L	H	H	H
L	H	L	H	L	H	H	H	H	H	H	L	H	H
L	H	L	H	H	L	H	H	H	H	H	H	L	H
L	H	L	H	H	H	H	H	H	H	H	H	H	L
H	H	L	X	X	X	*HOLD THE OUTPUT							

← SELECTED TO LOW

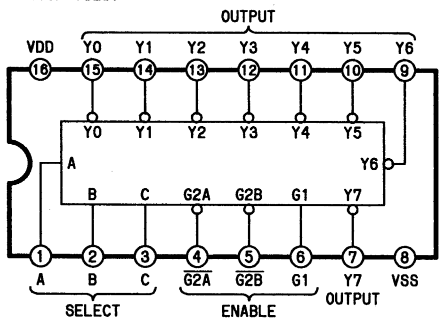
H:HIGH L:LOW X:HorL

*DEW TO ADDRESS CONDITION OF LATCH ENABLE

74138

(3-TO-8 LINE DECODER)

(TOP VIEW)



TRUTH TABLE (74HC138)

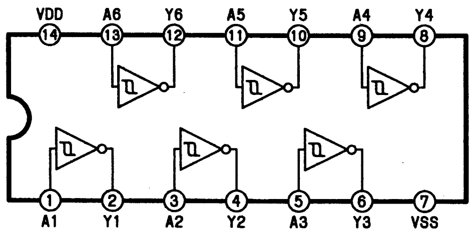
INPUTS					OUTPUTS							
ENABLE		SELECT										
G1	$\overline{G2}$•	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
×	H	×	×	×	H	H	H	H	H	H	H	H
L	×	×	×	×	H	H	H	H	H	H	H	H
H	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	H	H	L	H	H	H	H	H	H
H	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	H	H	H	H	H	L	H	H	H	H
H	L	H	L	L	H	H	H	H	L	H	H	H
H	L	H	L	H	H	H	H	H	H	L	H	H
H	L	H	H	L	H	H	H	H	H	H	L	H
H	L	H	H	H	H	H	H	H	H	H	H	L

• $\overline{G2} = \overline{G2A} + \overline{G2B}$

7414

(HEX.INVERTING SCHMITT TRIGGER)

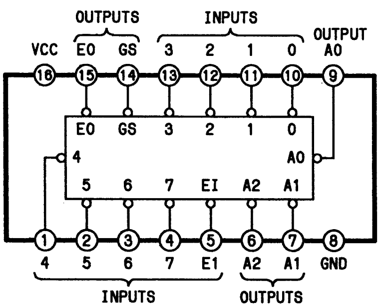
(TOP VIEW)



74148

(8-TO-3 LINE PRIORITY ENCODER)

(TOP VIEW)



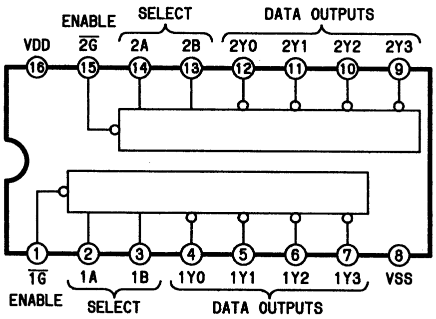
TRUTH TABLE

INPUTS									OUTPUTS				
E1	0	1	2	3	4	5	6	7	A2	A1	A0	GS	EO
H	X	X	X	X	X	X	X	X	H	H	H	H	H
L	H	H	H	H	H	H	H	H	H	H	H	H	L
L	X	X	X	X	X	X	X	L	L	L	L	L	H
L	X	X	X	X	X	X	L	H	L	L	H	L	H
L	X	X	X	X	X	L	H	H	L	H	L	L	H
L	X	X	X	X	L	H	H	H	L	H	H	L	H
L	X	X	X	L	H	H	H	H	H	L	L	L	H
L	X	X	L	H	H	H	H	H	H	L	H	L	H
L	X	L	H	H	H	H	H	H	H	H	L	L	H
L	L	H	H	H	H	H	H	H	H	H	H	L	H

74139

(DUAL 2-TO-4 LINE DECODER)

(TOP VIEW)



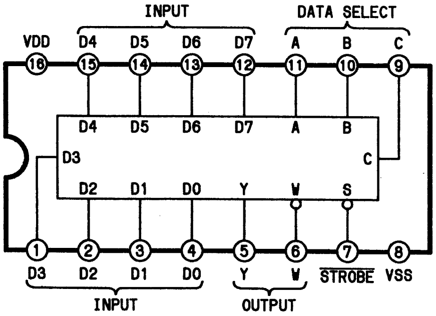
TRUTH TABLE

INPUTS			OUTPUTS			
ENABLE	SELECT					
G	B	A	Y0	Y1	Y2	Y3
H	×	×	H	H	H	H
L	L	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

74151

(8-CHANNEL DIGITAL MULTIPLEXER)

(TOP VIEW)

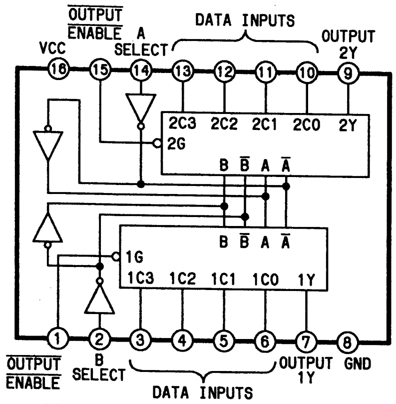


TRUTH TABLE

INPUTS				OUTPUTS	
SELECT			STROBE		
C	B	A	S	Y	W
×	×	×	H	L	H
L	L	L	L	D0	$\overline{D0}$
L	L	H	L	D1	$\overline{D1}$
L	H	L	L	D2	$\overline{D2}$
L	H	H	L	D3	$\overline{D3}$
H	L	L	L	D4	$\overline{D4}$
H	L	H	L	D5	$\overline{D5}$
H	H	L	L	D6	$\overline{D6}$
H	H	H	L	D7	$\overline{D7}$

74153
(DUAL 4 TO 1 DATA SELECTORS)

(TOP VIEW)



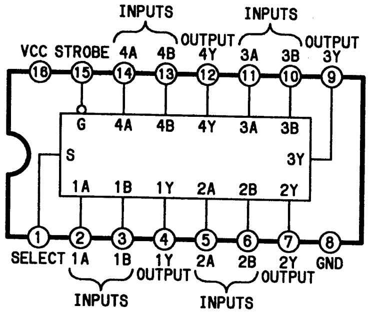
TRUTH TABLE

INPUT			OUTPUT
SELECT		OUTPUT ENABLE	Y
B	A		
×	×	H	L
L	L	L	C0
L	H	L	C1
H	L	L	C2
H	H	L	C3

H:HIGH L:LOW X:H or L

74157.74158
(QUAD 2-INPUT MULTIPLEXER)

(TOP VIEW)

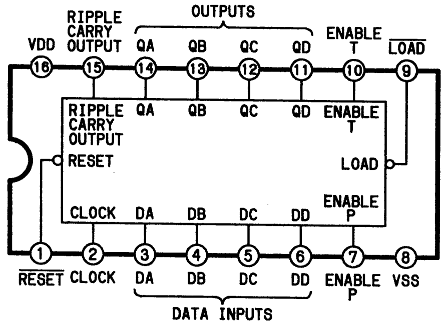


TRUTH TABLE (74HC157)

INPUTS				OUTPUT Y	
STROBE	SELECT	A	B	HC157	HC158
H	×	×	×	L	H
L	L	L	×	L	H
L	L	H	×	H	L
L	H	×	L	L	H
L	H	×	H	H	L

74161
(4-BIT SYNCHRONOUS BINARY COUNTER)

(TOP VIEW)



TRUTH TABLE (74HC160/74HC161)

INPUT					OUTPUT
CLOCK	RESET	LOAD	ENABLE P	ENABLE T	Qn
×	L	×	×	×	L
↑	H	L	×	×	LOAD
↑	H	H	H	H	COUNT
×	H	H	L	×	NO COUNT
×	H	H	×	L	NO COUNT

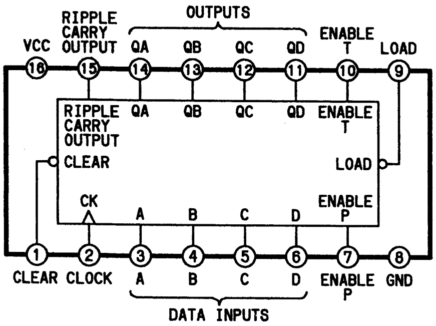
H:HIGH L:LOW X:H or L
n:A~D

FUNCTION TABLE (74161)

INPUT					OUTPUT		FUNCTION
CLEAR	LOAD	CK	ENABLE P	ENABLE T	QA QB QC QD	RIPPLE CARRY	
H	H	↑	H	H		—	COUNT
H	L	↑	X	X	DA DB DC DD	—	DATA SET
L	X	X	X	X	L L L L	—	CLEAR
H	X	X	X	H	H H H H	H	—

74163
(4-BIT SYNCHRONOUS BINARY COUNTER WITH SYNCHRONOUS CLEAR)

(TOP VIEW)

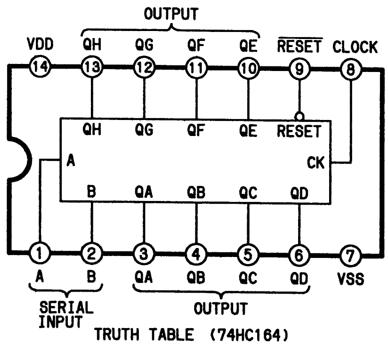


TRUTH TABLE

CLK	CLR	ENP	ENT	LOAD	FUNCTION
↑	L	X	X	X	CLEAR
X	H	H	L	H	COUNT & RC DISABLED
X	H	L	H	H	COUNT DISABLED
X	H	L	L	H	COUNT & RC DISABLED
↑	H	X	X	L	LOAD
↑	H	H	H	H	INCREMENT COUNTER

74164
(8-BIT SERIAL-IN/PARALLEL-OUT SHIFT REGISTER)

(TOP VIEW)



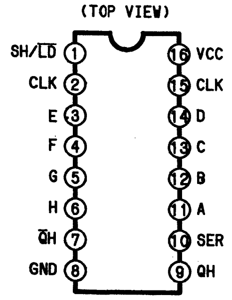
TRUTH TABLE (74HC164)

INPUT				OUTPUT		
RESET	CLOCK	A	B	QA	QB	QH
L	×	×	×	L	L	L
H	↓	×	×	NO CHANGE		
H	↑	L	×	L	QA	QG
H	↑	×	L	L	QA	QG
H	↑	H	H	H	QA	QG

H:HIGH L:LOW X:H or L

74165
(PARALLEL-LOAD 8-BIT SHIFT REGISTERS)

(TOP VIEW)

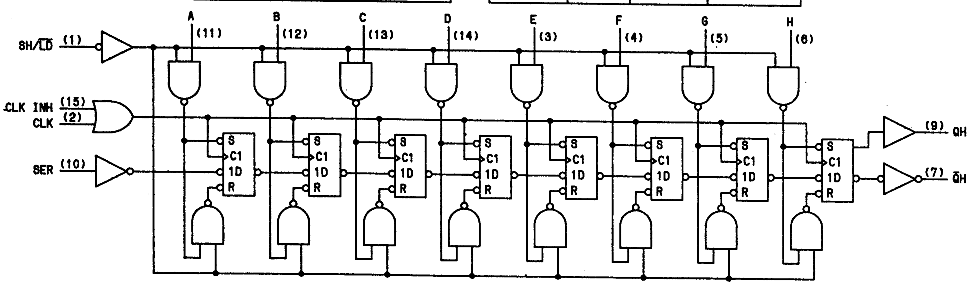


TRUTH TABLE

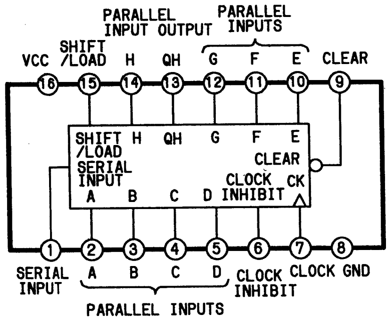
INPUT			FUNCTION
SH/LD	CLK	CLK INH	
L	X	X	PARALLEL INPUT
H	H	X	NO CHANGE
H	X	H	NO CHANGE
H	L	↑	SHIFT
H	↑	L	SHIFT

FUNCTION TABLE

INPUT			FUNCTION
SHIFT/LOAD	CK	CK INHIBIT	
H	↑	L	RIGHT SHIFT
L	X	X	DATA SET
H	X	H	HOLD



74166
(8-BIT SHIFT REGISTER)

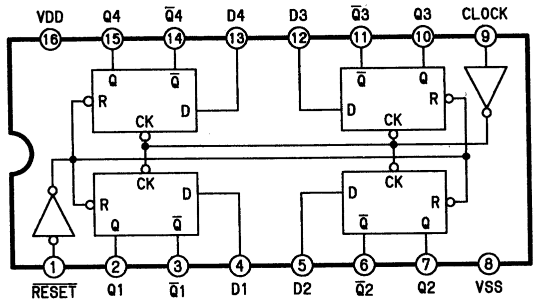


TRUTH TABLE

INPUT				FUNCTION
CLEAR	SHIFT/LOAD	CK	CK INHIBIT	
H	H	↑	L	RIGHT SHIFT
H	L	↑	L	LOAD
H	H	X	H	HOLD
⊔	X	X	X	CLEAR

74175
(QUAD D-TYPE FLIP-FLOP WITH CLEAR)

(TOP VIEW)



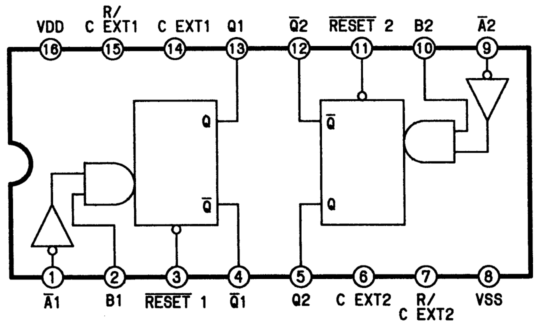
TRUTH TABLE (74HC175)

INPUT			OUTPUT	
CLOCK	RESET	D	Q	Q̄
X	L	X	L	H
↑	H	H	H	L
↑	H	L	L	H
L	H	X	NO CHANGE	

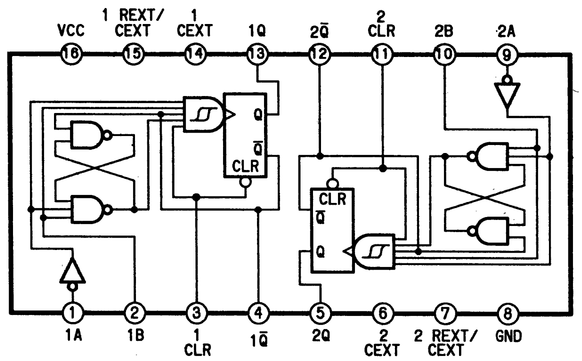
H:HIGH L:LOW X:H or L

74221
(DUAL NON-RETRIGGERABLE MONOSTABLE MULTIVIBRATOR)

(TOP VIEW)



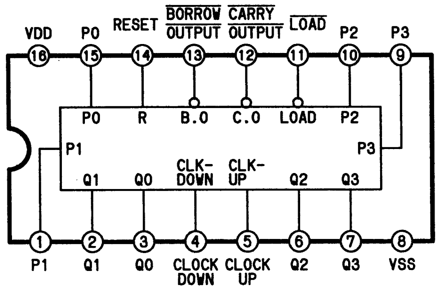
(74HC221)



(74221)

74193
(4-BIT SYNCHRONOUS BINARY UP/DOWN COUNTER)

(TOP VIEW)



P0～P3 PRESET INPUT
Q0～Q3 BINARY OUTPUT

TRUTH TABLE

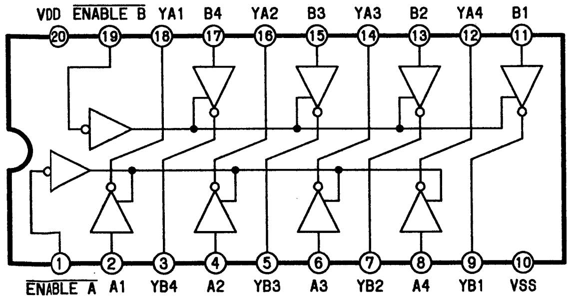
COUNT		CLEAR	LOAD	FUNCTION
UP	DOWN			
↑	H	L	H	COUNT UP
H	↑	L	H	COUNT DOWN
×	×	H	×	CLEAR
×	×	L	L	LOAD

TRUTH TABLE (74HC221)

INPUTS			OUTPUTS	
CLEAR	A	B	Q	Q̄
L	×	×	L	H
×	H	×	L	H
×	×	L	L	H
H	L	↑	⎍	⊔
H	↓	H	⎍	⊔
↑	L	H	⎍	⊔

74240
(INVERTING OCTAL 3-STATE BUFFER)

(TOP VIEW)

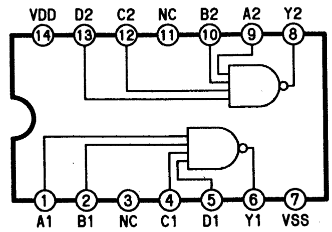


TRUTH TABLE (74HC240)

1G̅	1A	1Y	2G̅	2A	2Y
L	L	H	L	L	H
L	H	L	L	H	L
H	L	Z	H	L	Z
H	H	Z	H	H	Z

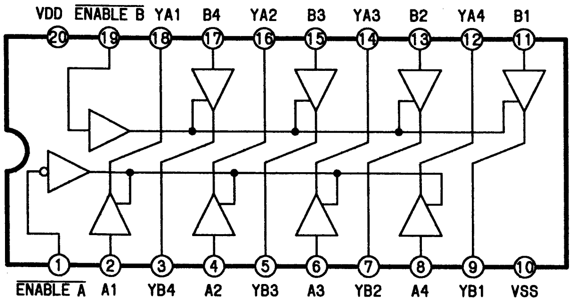
7420
(DUAL 4-INPUT NAND GATE)

(TOP VIEW)



74241
(INVERTING OCTAL 3-STATE BUFFER)

(TOP VIEW)

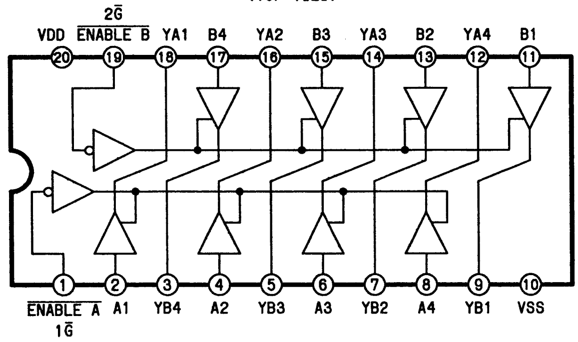


TRUTH TABLE (74HC241)

1G̅	1A	1Y	2G̅	2A	2Y
L	L	L	H	L	L
L	H	H	H	H	H
H	L	Z	L	L	Z
H	H	Z	L	H	Z

74244
(OCTAL 3-STATE BUFFER)

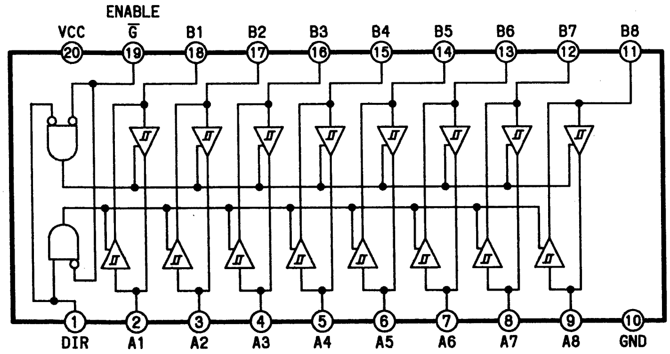
(TOP VIEW)



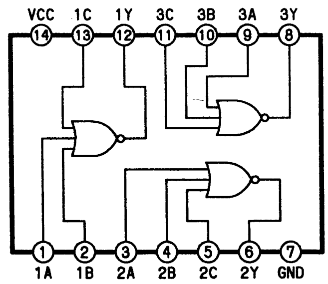
TRUTH TABLE (74HC244)

1G̅	1A	1Y	2G̅	2A	2Y
L	L	L	L	L	L
L	H	H	L	H	H
H	L	Z	H	L	Z
H	H	Z	H	H	Z

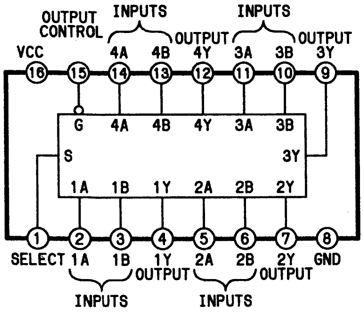
74245
(OCTAL 3-STATE BUS TRANSCEIVERS)



7427
(TRIPLE 3-INPUT NOR GATE)



74257
(QUAD 2-CHANNEL 3-STATE MULTIPLEXER)



FUNCTION TABLE (74257)

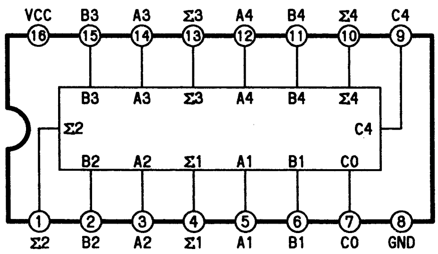
INPUTS		OUTPUT
SELECT	OUTPUT CONTROL	Y
X	H	Z
L	L	A
H	L	B

TRUTH TABLE (74HC257)

INPUTS				OUTPUT
OUTPUT CONTROL	SELECT	A	B	Y
H	×	×	×	Z
L	L	L	×	L
L	L	H	×	H
L	H	×	L	L
L	H	×	H	H

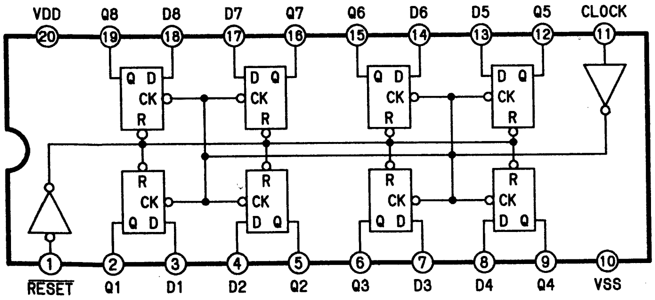
74283
(4-BIT BINARY ADDER WITH FAST CARRY)

(TOP VIEW)



74273
(OCTAL D-TYPE FLIP-FLOP WITH CLEAR)

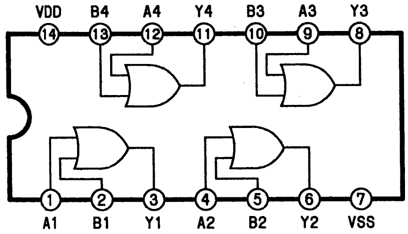
(TOP VIEW)



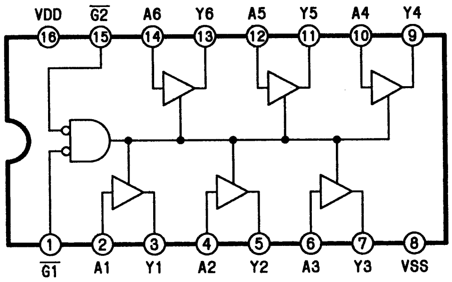
TRUTH TABLE (74HC273)

INPUTS			OUTPUTS
CLEAR	CLOCK	D	Q
L	×	×	L
H	↑	H	H
H	↑	L	L
H	L	×	Q0

7432
(QUAD 2-INPUT OR GATE)
(TOP VIEW)



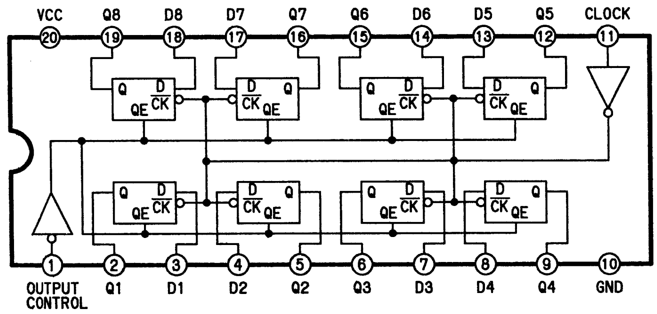
74365
(HEX.3-STATE BUFFER)
(TOP VIEW)



TRUTH TABLE (74HC365)

INPUTS			OUTPUT
$\overline{G1}$	$\overline{G2}$	A	Y
H	×	×	Z
×	H	×	Z
L	L	H	H
L	L	L	L

74374
(3-STATE OCTAL D-TYPE FLIP-FLOP)
(TOP VIEW)



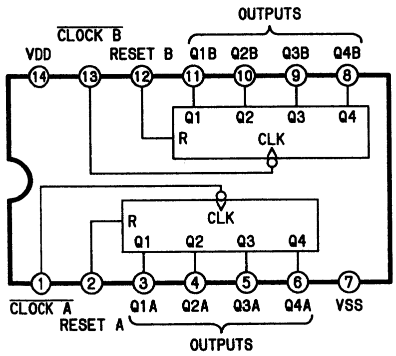
TRUTH TABLE (74HC374)

OUTPUT CONTROL	CLOCK	DATA	OUTPUT
L	↑	H	H
L	↑	L	L
L	L	×	Q0
H	×	×	Z

FUNCTION TABLE (74374)

INPUT		FUNCTION
OUTPUT CTL	CK	
×	↑	DATA SET
H	×	HIGH IMPE OUT

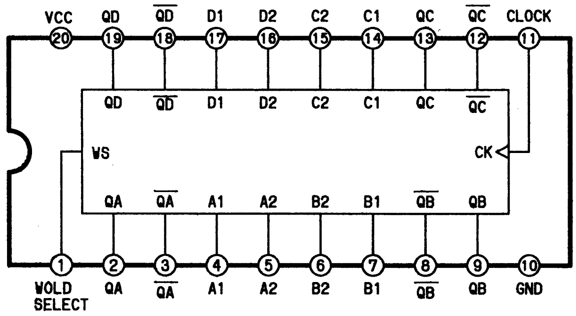
74393
(DUAL 4-BIT BINARY COUNTER)
(TOP VIEW)



TRUTH TABLE (74HC393)

INPUTS		FUNCTION
CLOCK	CLEAR	
↓	L	INCREMENT
×	H	CLEAR

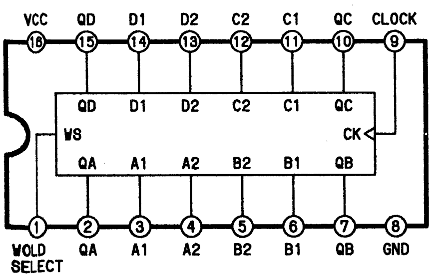
74398
(4-BIT 2 INPUT MULTIPLEX REGISTER)
(TOP VIEW)



TRUTH TABLE

INPUT		OUTPUT			
WOLD SELECT	CK	QA	QB	QC	QD
L	↑	DA1	DB1	DC1	DD1
H	↑	DA2	DB2	DC2	DD2

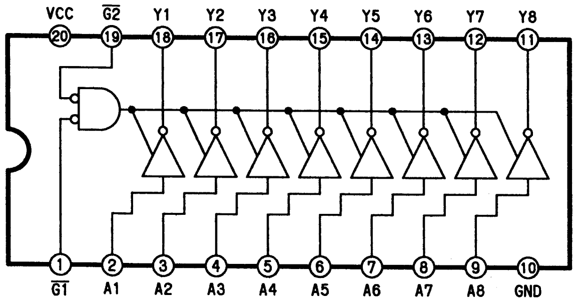
74399
(4-BIT 2 INPUT MULTIPLEX REGISTER)
(TOP VIEW)



TRUTH TABLE

INPUT		OUTPUT			
WOLD SELECT	CK	QA	QB	QC	QD
L	↑	DA1	DB1	DC1	DD1
H	↑	DA2	DB2	DC2	DD2

74540
(INVERTING OCTAL 3-STATE BUFFER)

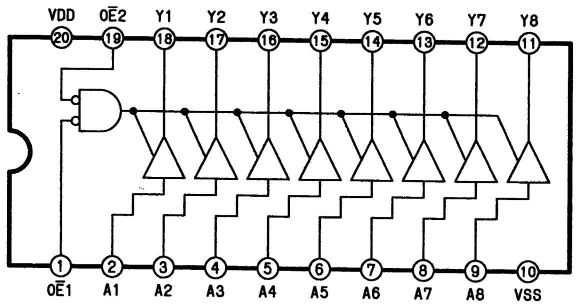


TRUTH TABLE

INPUT		OUTPUT
E1	E2	
L	L	D
H	×	HIGH Z
×	H	

74541
(OCTAL 3-STATE BUFFER)

(TOP VIEW)



O$\overline{E}$1.O$\overline{E}$2:$\overline{OUTPUT}$ $\overline{ENABLE}$

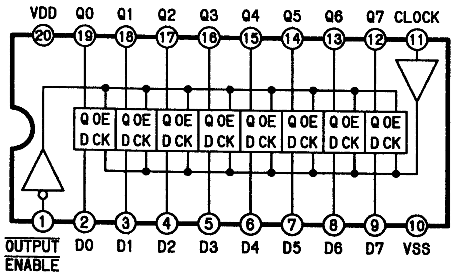
TRUTH TABLE

INPUT			OUTPUT
O$\overline{E}$1	O$\overline{E}$2	A	Y
L	L	L	L
L	L	H	H
H	×	×	Z
×	H	×	Z

X:H or L Z:HIGH IMPEDANCE

74574
(OCTAL D-TYPE FLIP-FLOP)

(TOP VIEW)



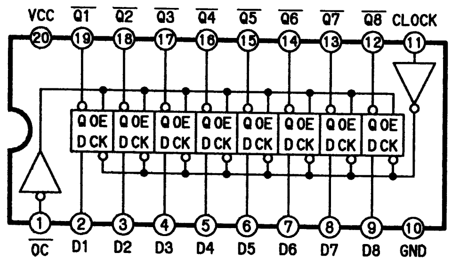
TRUTH TABLE (74HC574)

INPUT			OUTPUT
$\overline{OUTPUT}$ $\overline{ENABLE}$	CLOCK	DATA D	Q
L	↑	H	H
L	↑	L	L
L	↓	×	NO CHANGE
H	×	×	Z

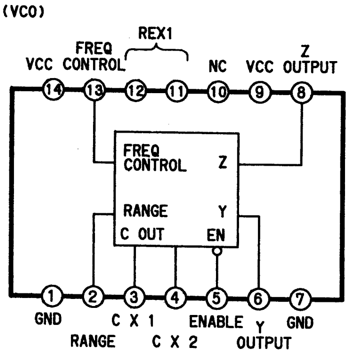
X:H or L Z:HIGH IMPEDANCE

74576
(OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH INVERTED OUTPUTS)

(TOP VIEW)

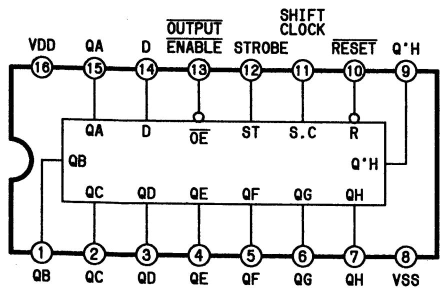


74628
(VCO)



74595
(8-BIT SHIFT REGISTER WITH OUTPUT LATCH)

(TOP VIEW)



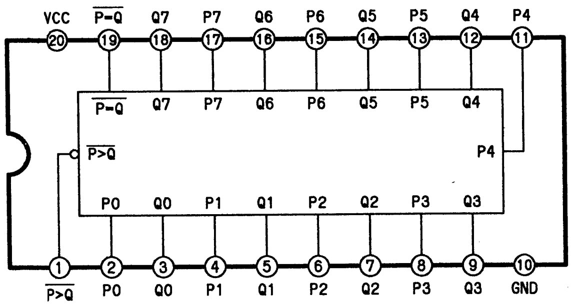
TRUTH TABLE (74HC595)

RCK	SCK	$\overline{SCLR}$	$\overline{G}$	FUNCTION
×	×	×	1	QA THRU QH=TRI-STATE
×	×	L	×	SHIFT REGISTER CLEARED QH'=0
×	↑	H	×	SHIFT REGISTER CLOCKED QN=Qn-1,Q0=SER
↑	×	H	×	CONTENTS OF SHIFT REGISTER TRANSFERRED TO OUTPUT LATCHES

QA～QH:PARALLEL OUTPUTS
Q'H :SERIAL OUTPUT

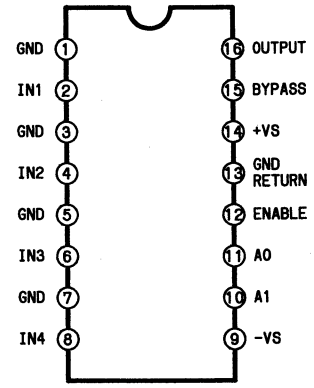
74682
74684
(8-BIT MAGNITUDE COMPARATORS)

(TOP VIEW)



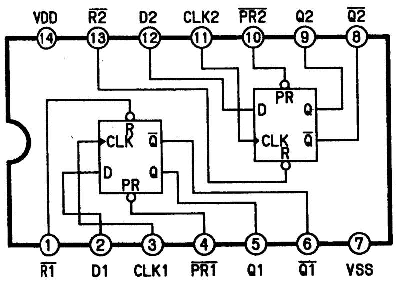
AD9300 (SELECT SWITCH)

(TOP VIEW)



7474
(DUAL D-TYPE FLIP-FLOP)

(TOP VIEW)



CLK:CLOCK
PR:PRESET
R:RESET
D:DATA

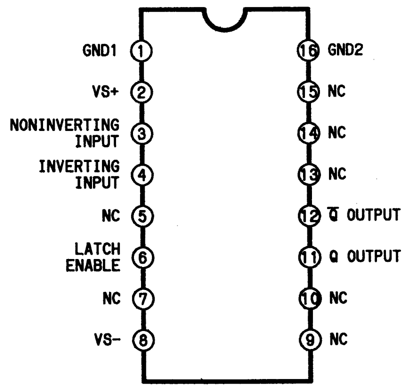
TRUTH TABLE (74HC74)

INPUTS				OUTPUTS	
PR	CLR	CLK	D	Q	$\overline{Q}$
L	H	×	×	H	L
H	L	×	×	L	H
L	L	×	×	H*	H*
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	×	Q0	$\overline{Q0}$

*:UNSTABLE

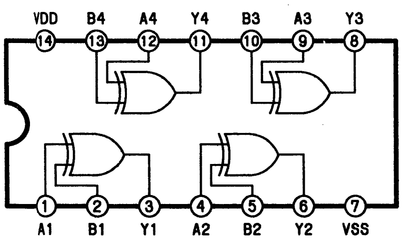
AD96685 (COMPARATOR)

(TOP VIEW)



7486
(QUAD EXCLUSIVE OR GATE)

(TOP VIEW)



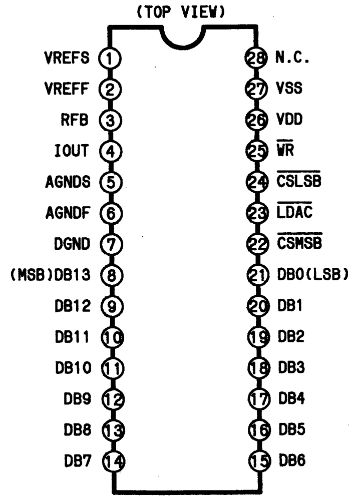
$Y = A \oplus B = \overline{A}B + A\overline{B}$

TRUTH TABLE

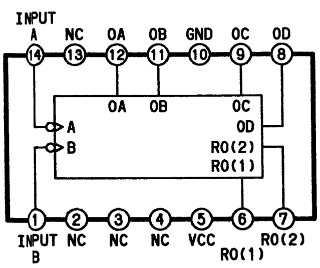
INPUTS		OUTPUTS
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

AD7535
(TIMING CHARACTERISTICS)

(TOP VIEW)



7492
(DIVIDE BY TWELVE COUNTER)

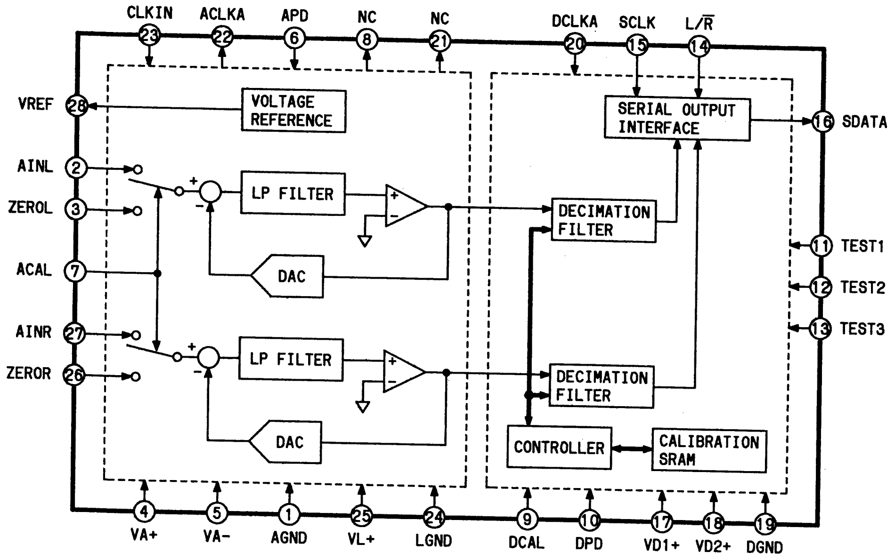


FUNCTION TABLE

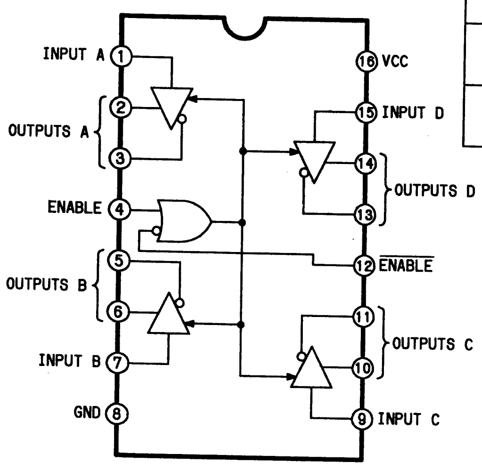
INPUT				OUTPUT				FUNCTION
RO	CK A	CK B	PULS	QA	QB	QC	QD	
L	⎍	⎍	0	L	L	L	L	COUNT
			1	H	H	L	L	
			2	L	L	H	L	
			3		L	L	H	
			4		H	L	H	
			5		L	H	H	
			6		L	L	L	
H	×	×	—	L	L	L	L	CLEAR

RO=RO(1).RO(2)

AK5326
(HIGH PERFORMANCE STEREO A/D CONVERTER)

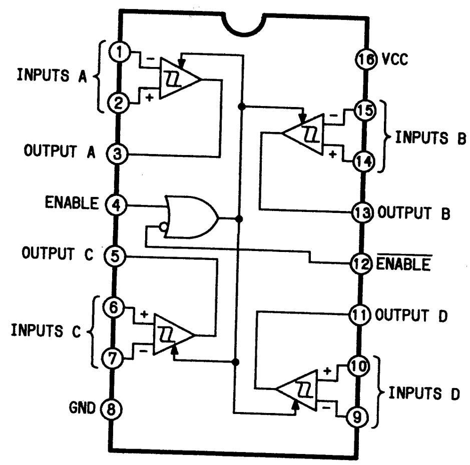


AM26LS31PC
(QUAD DIFF LINE(RS422)DRIVER)



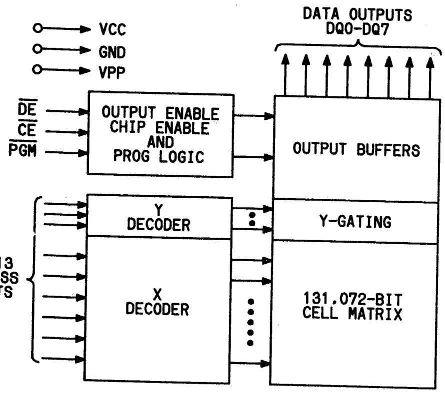
TRUTH TABLE			
IN	CONTROL (E/$\overline{E}$)	NON-INVERTING OUTPUT	INVERTING OUTPUT
H	H/L	H	L
L	H/L	L	H
X	L/H	Z	Z

AM26LS32PC
(QUAD DIFF LINE(RS422/423)RECEIVER)

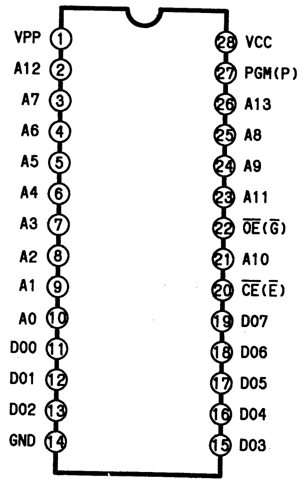


AM27C128
(16,384×8-BIT CMOS EPROM)

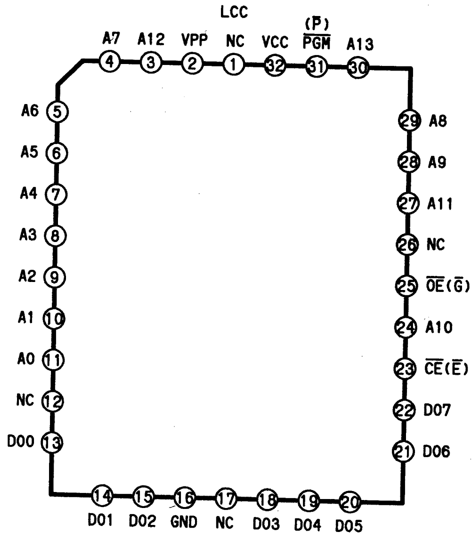
BLOCK DIAGRAM



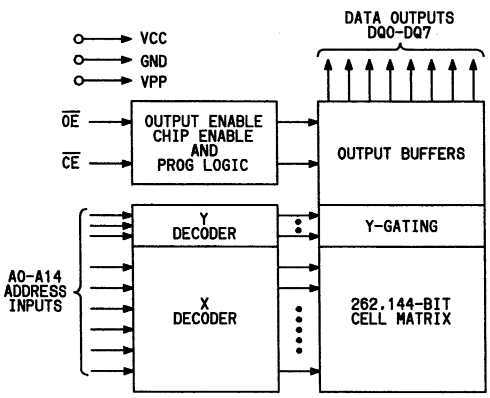
DIP

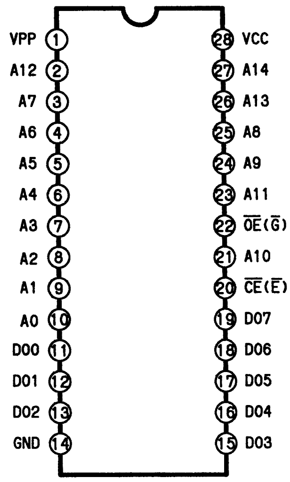


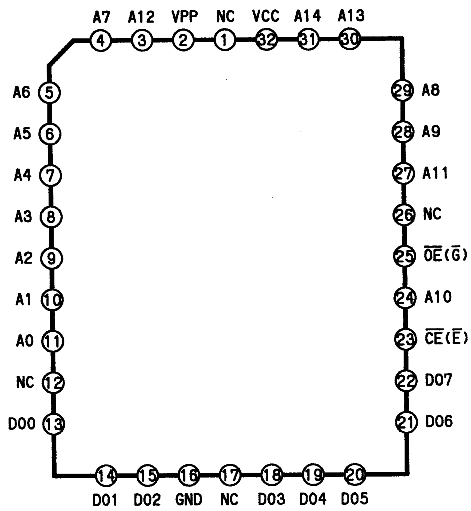
LCC



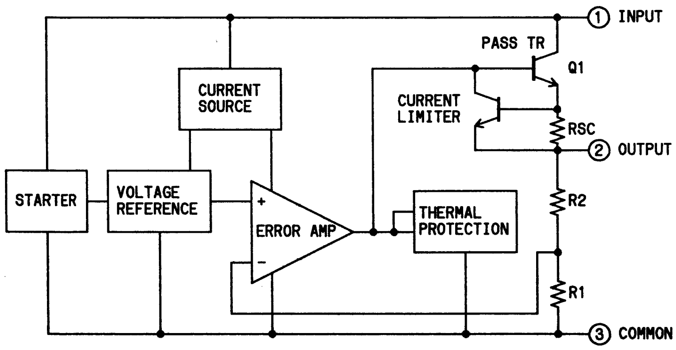
AM27C256
(32,768×8-BIT CMOS EPROM)

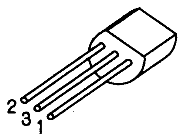




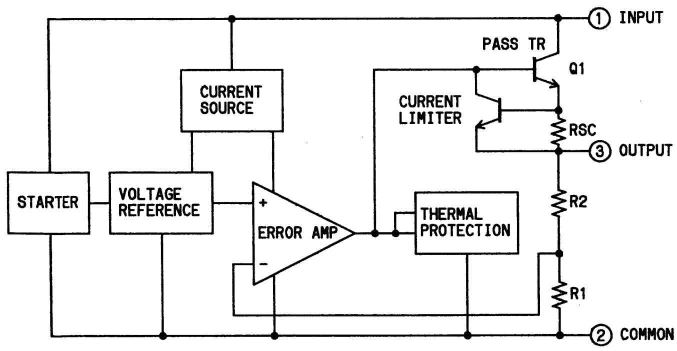


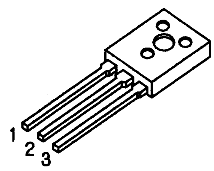
AN78L00
(3-TERMINAL POSITIVE OUTPUT VOLTAGE REGULATOR)



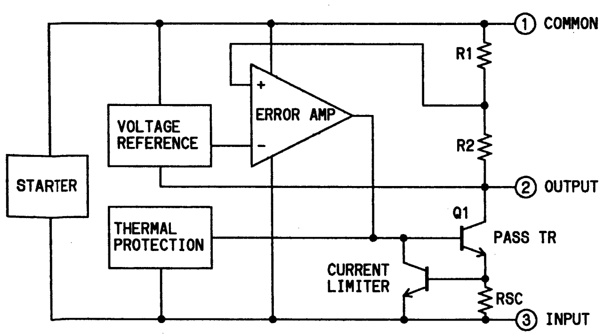


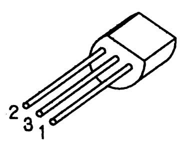
AN78N00
(3-TERMINAL POSITIVE OUTPUT VOLTAGE REGULATOR)



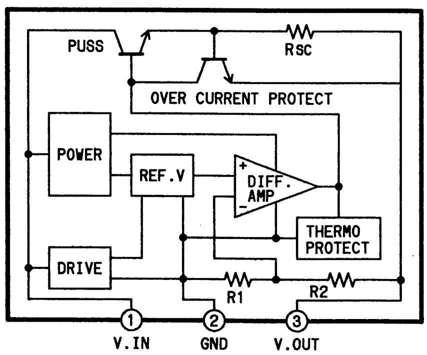


AN79L00
(3-TERMINAL NEGATIVE OUTPUT VOLTAGE REGULATOR)

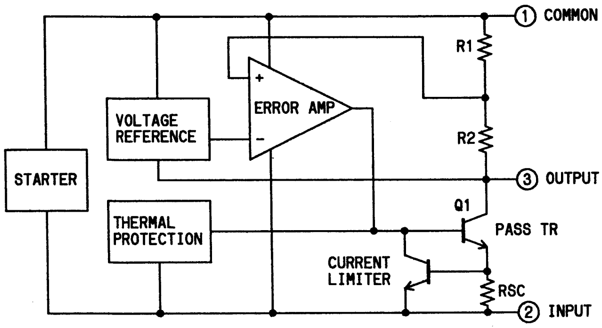


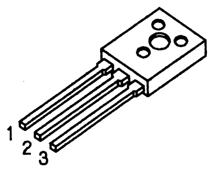


AN7805

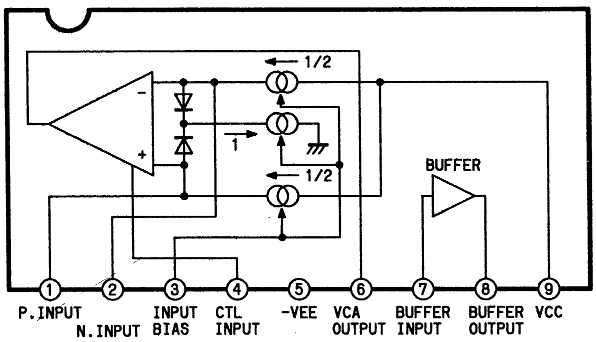


AN79N00
(3-TERMINAL NEGATIVE OUTPUT VOLTAGE REGULATOR)

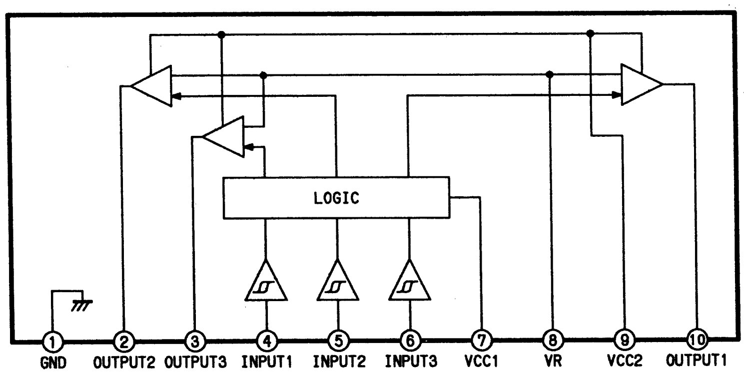




BA6110
(VOLTAGE CONTROL AMP)

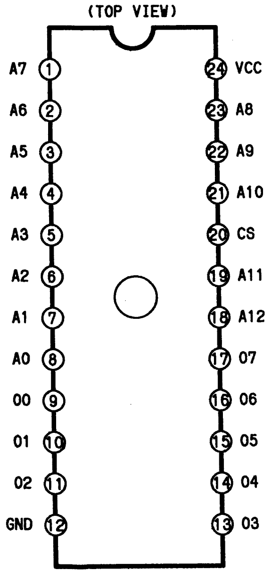


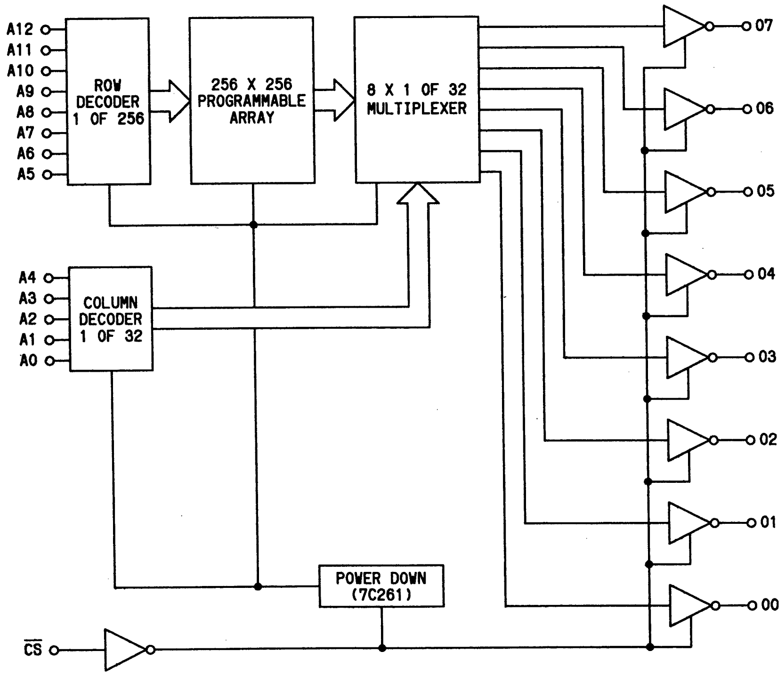
BA6238
(LOADING REGULATOR)



CY261-45WC

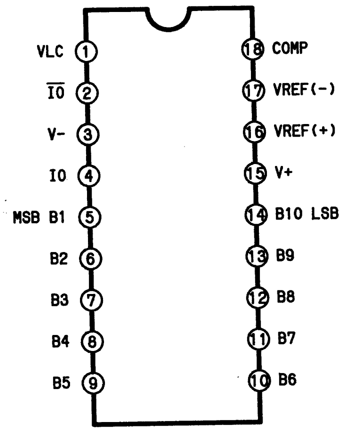
(TOP VIEW)





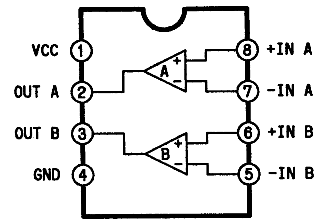
DAC10-GX (10-BIT D/A CONVERTER)
(18PIN HERMETIC DIP)

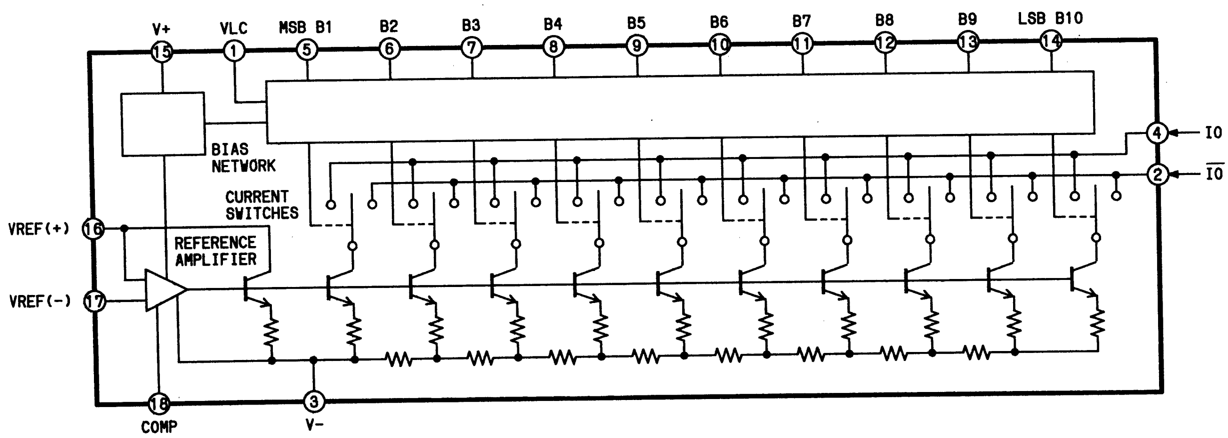
(TOP VIEW)



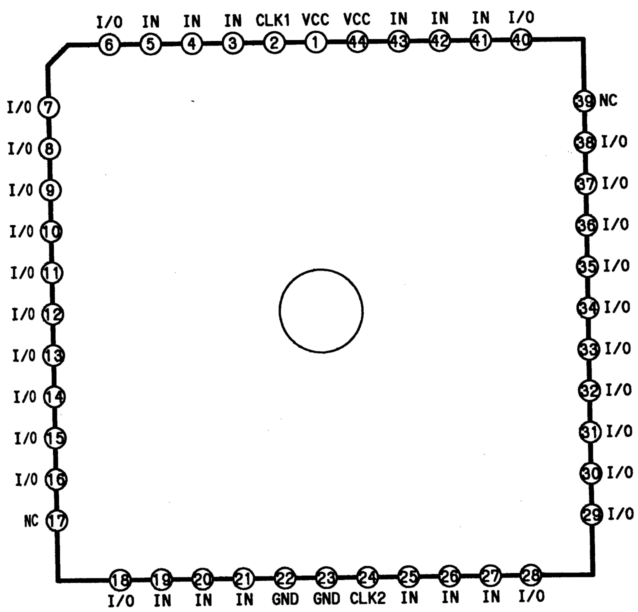
DS9637A
(DUAL DIFFERENTIAL LINE RECEIVER)

(TOP VIEW)



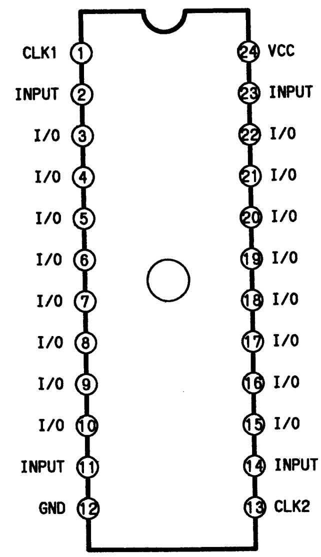


EP910 (C-MOS EPROM) (TOP VIEW)

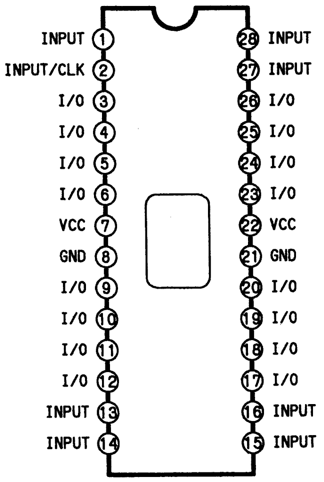


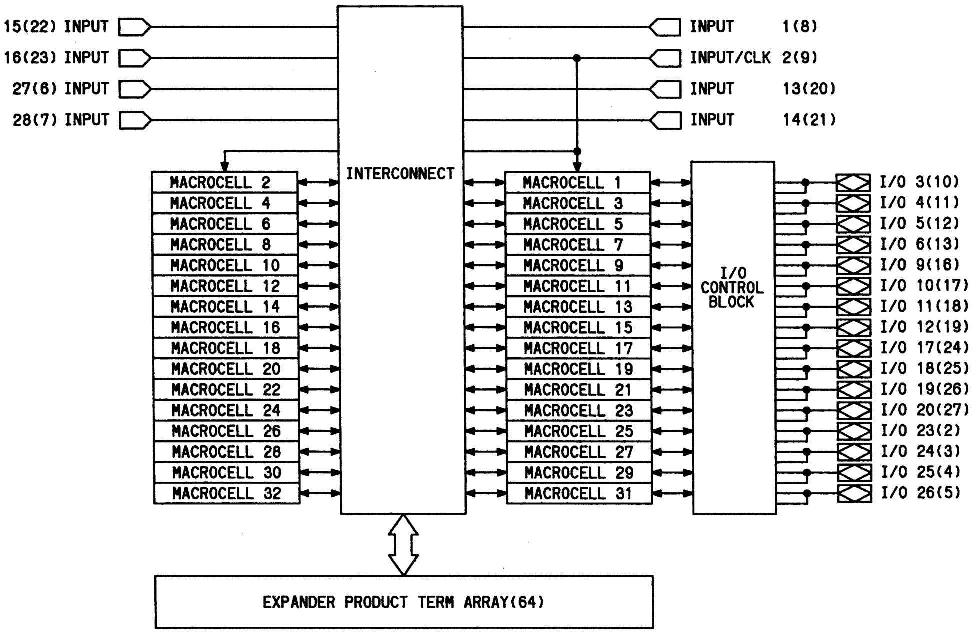
EP610
(16 MACROCELL EPLD)

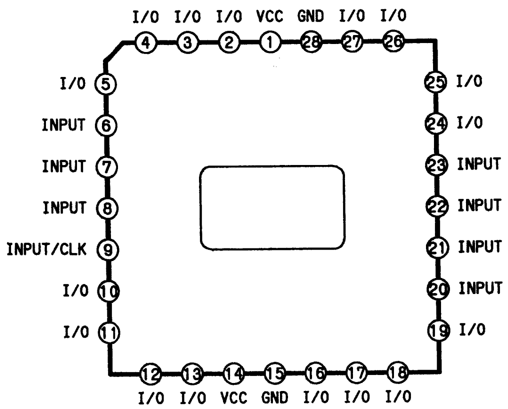
(TOP VIEW)



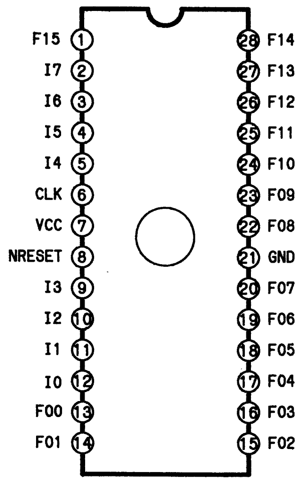
EPM5032 (C-MOS EPLD)

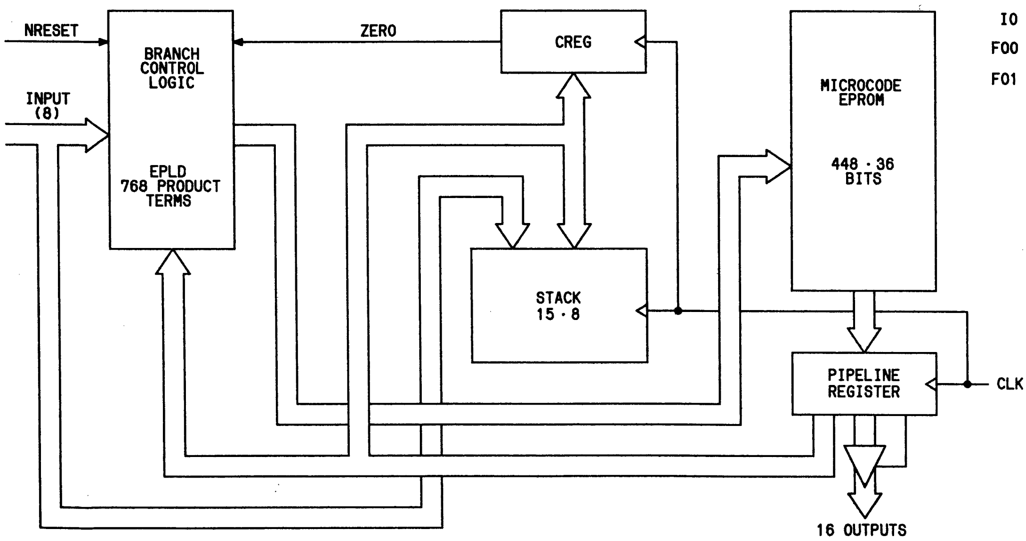




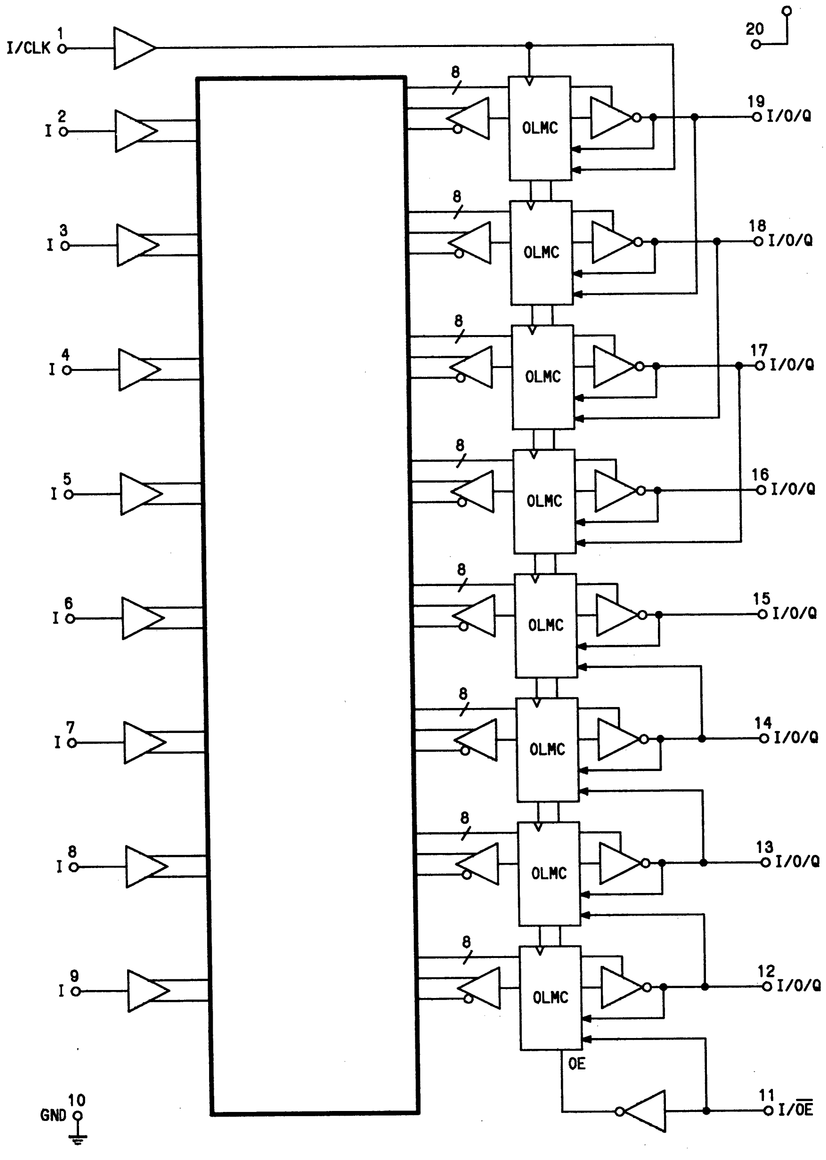


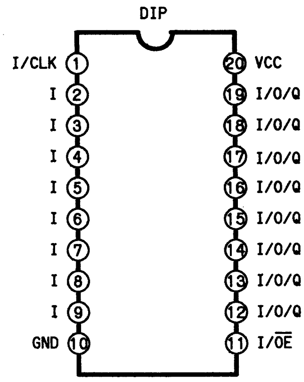
EPS448
(STAND-ALONE MICRO SEQUENCER)



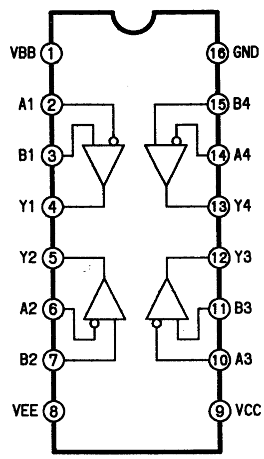


GAL16V8A
(E[3] CMOS 64×32 PROGRAMMABLE AND ARRAY)

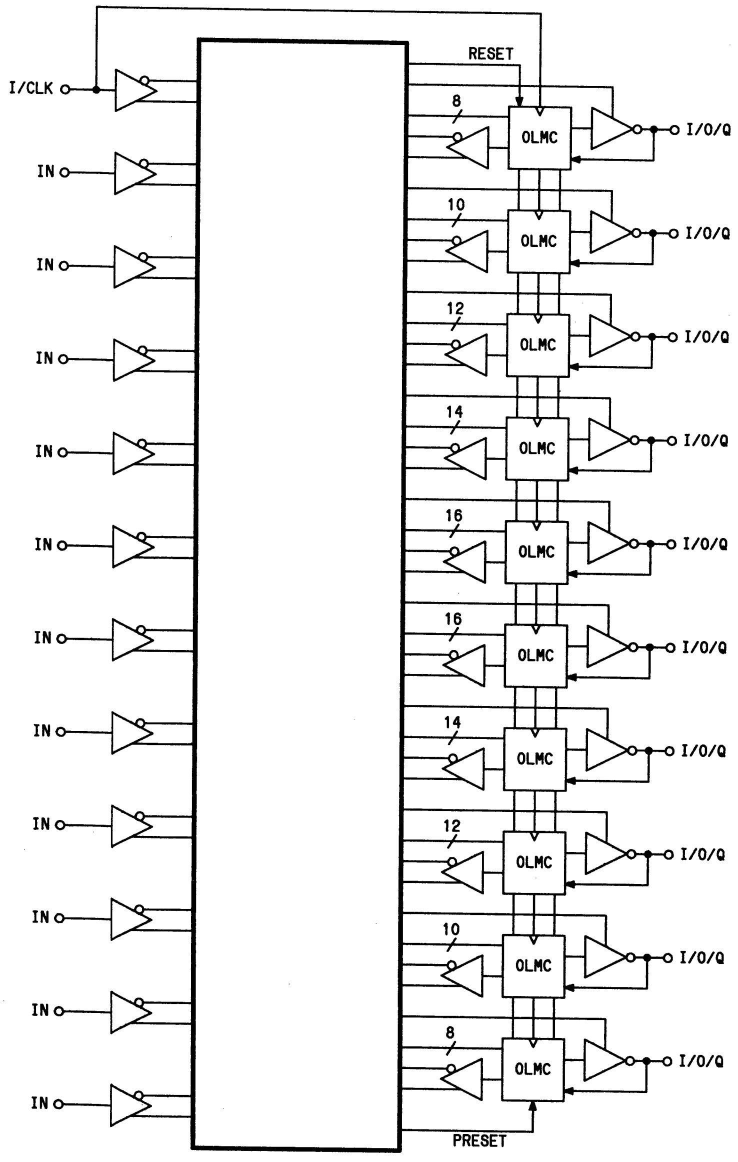




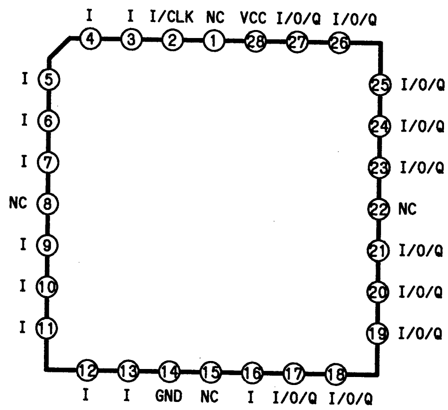
HD10125
(QUADRUPLE ECL TO TTL TRANSLATORS)
(TOP VIEW)

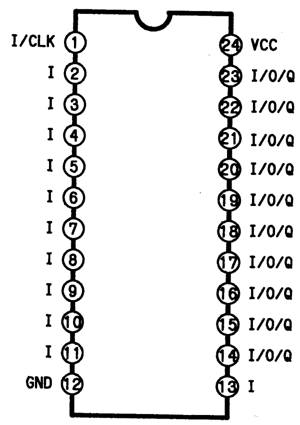


GAL22V10
(PROGRAMMABLE AND-ARRAY(132 × 44))



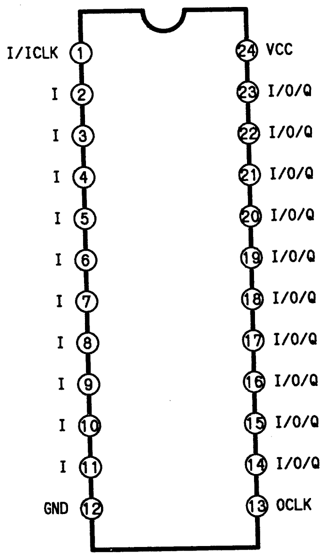
(TOP VIEW)

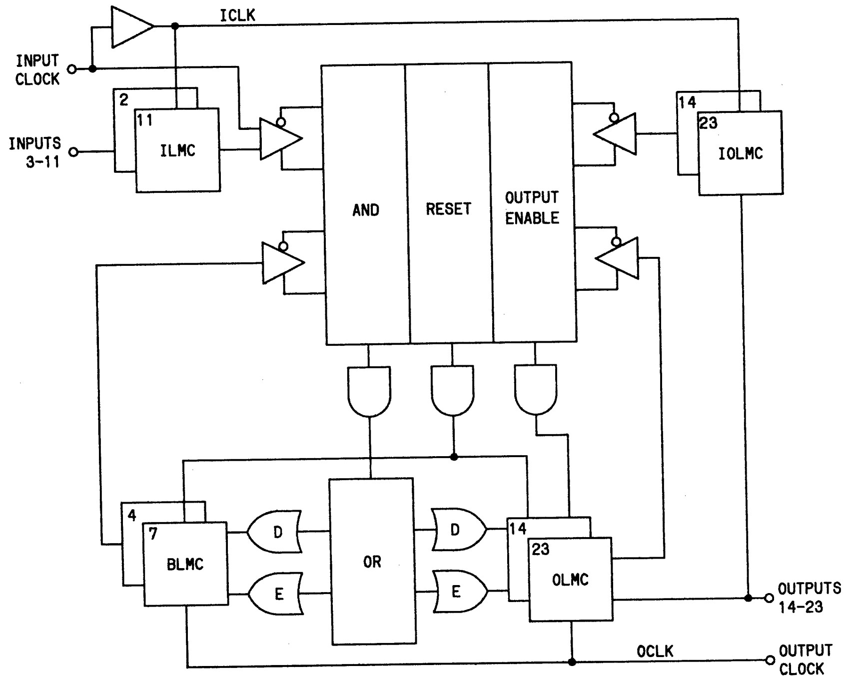




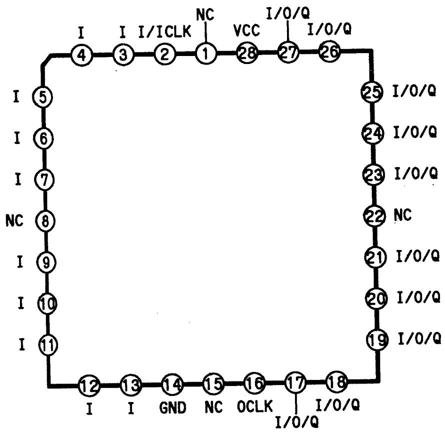
GAL6001 (PROGRAM AND-ARRAY)

(TOP VIEW)



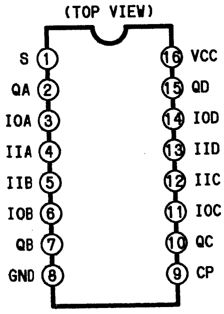


(TOP VIEW)

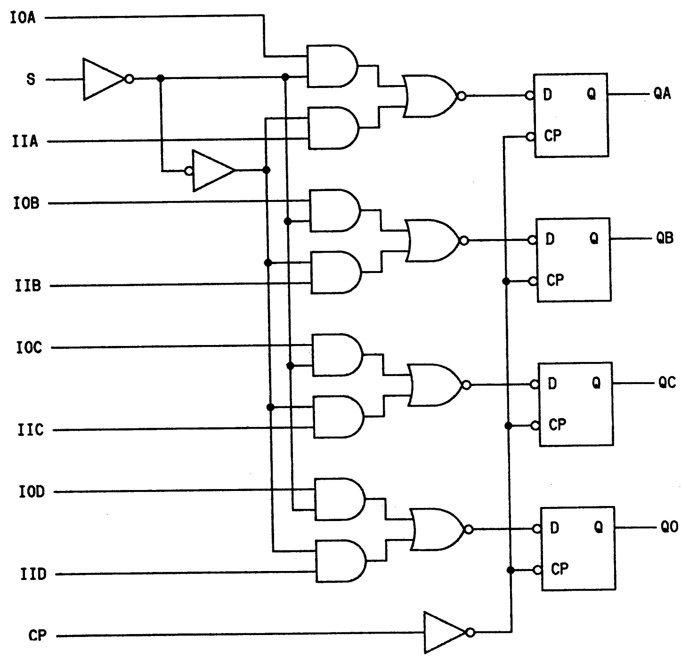


IDTFCT399AS0 (LATCH)

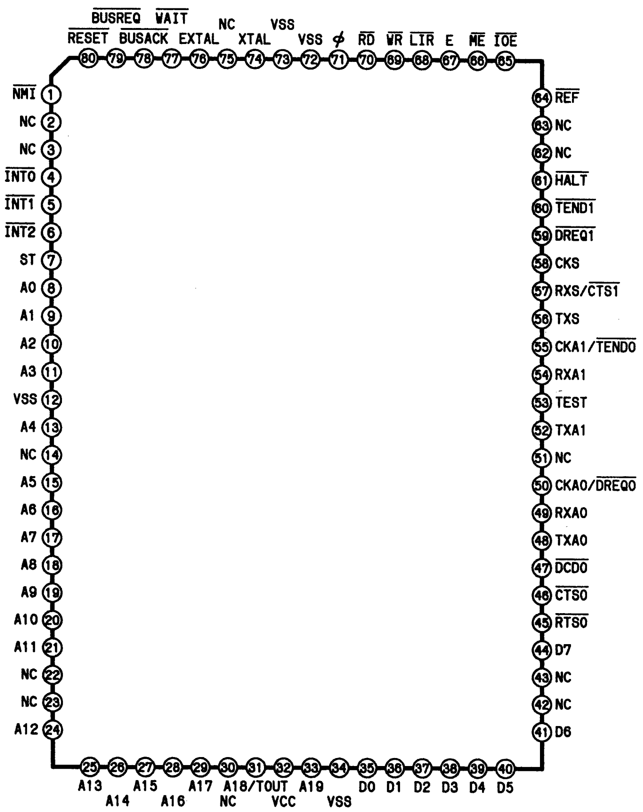
(TOP VIEW)



INPUTS			OUTPUTS
S	IO	II	Q
I	I	X	L
I	h	X	H
h	X	I	L
h	X	h	H

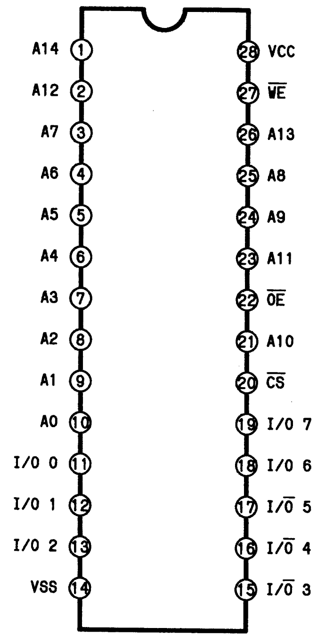


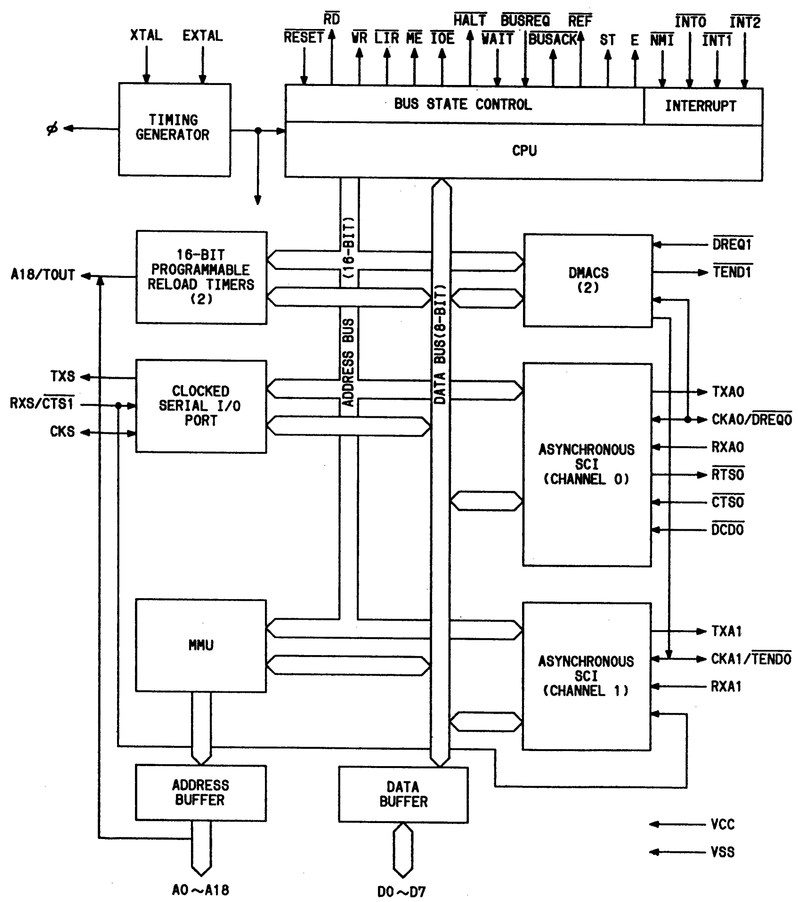
HD64180
(8BIT MC)



HM62832P-35
(262.144-BIT C-MOS RAM)

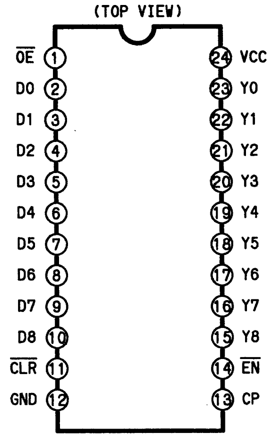
(TOP VIEW)

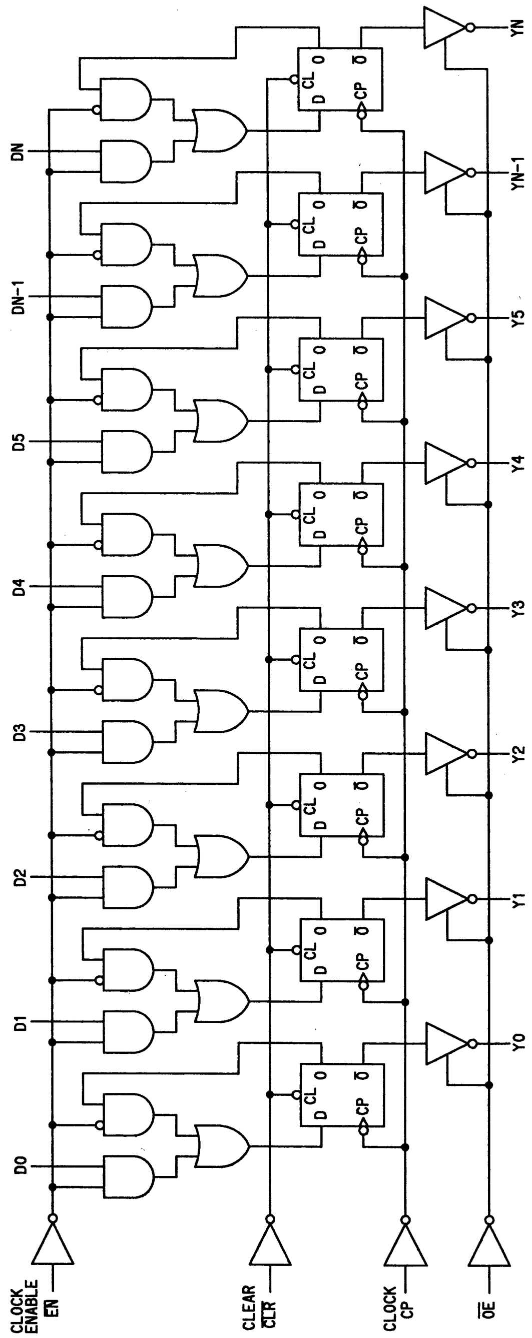




IDTFCT823BSO (LATCH)

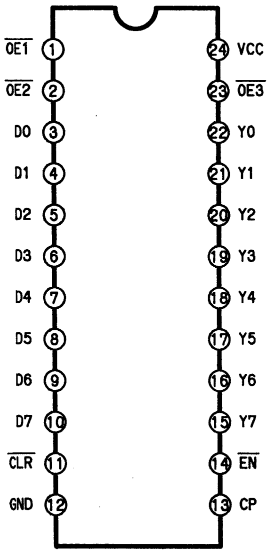
(TOP VIEW)





IDTFCT825AP (LATCH)

(TOP VIEW)



TRUTH TABLE

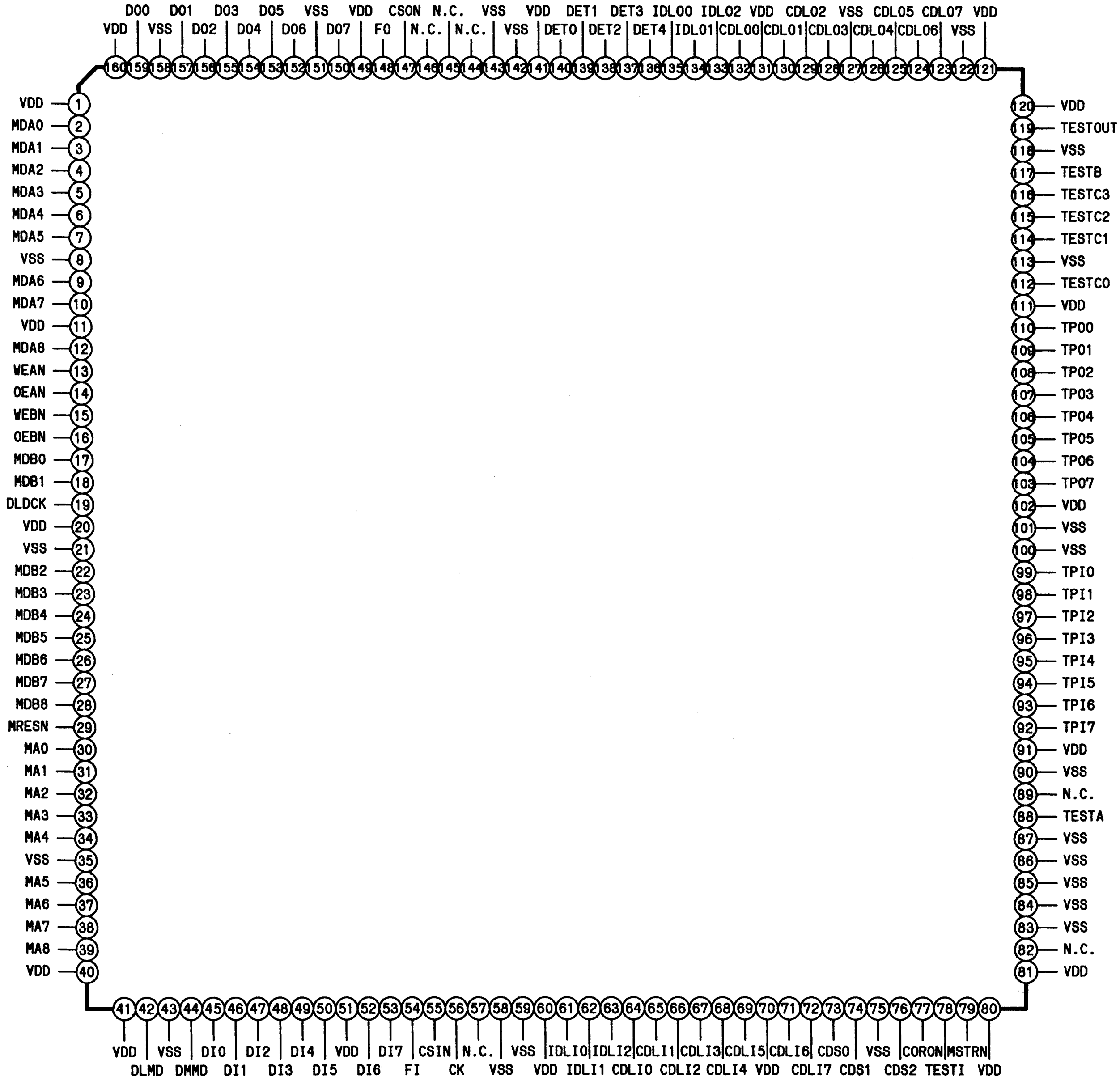
INPUTS					INTERNAL OUTPUTS		FUNCTION
$\overline{OE}$	$\overline{CLR}$	$\overline{EN}$	D1	CP	Q1	Y1	
H	X	L	L	↑	L	Z	HIGH Z
H	X	L	H	↑	H	Z	
H	L	X	X	X	L	Z	CLEAR
L	L	X	X	X	L	L	
H	H	H	X	X	NC	Z	HOLD
L	H	H	X	X	NC	NC	
H	H	L	L	↑	L	Z	LOAD
H	H	L	H	↑	H	Z	
L	H	L	L	↑	L	L	
L	H	L	H	↑	H	H	

H:HIGH L:LOW X:DON'T CARE
NC:NO CHANGE ↑:LOW TO HIGH TRANSITION
Z:HIGH IMPEDANCE

INPUTS					INTERNAL OUTPUTS		FUNCTION
$\overline{OE}$	$\overline{CLR}$	$\overline{EN}$	D1	CP	O1	Y1	
H	X	L	L	T	L	Z	HIGH Z
H	X	L	H	T	H	Z	
H	L	X	X	X	L	Z	CLEAR
L	L	X	X	X	L	L	
H	H	H	X	X	NC	Z	HOLD
L	H	H	X	X	NC	NC	
H	H	L	L	T	L	Z	LOAD
H	H	L	H	T	H	Z	
L	H	L	L	T	L	L	
L	H	L	H	T	H	H	

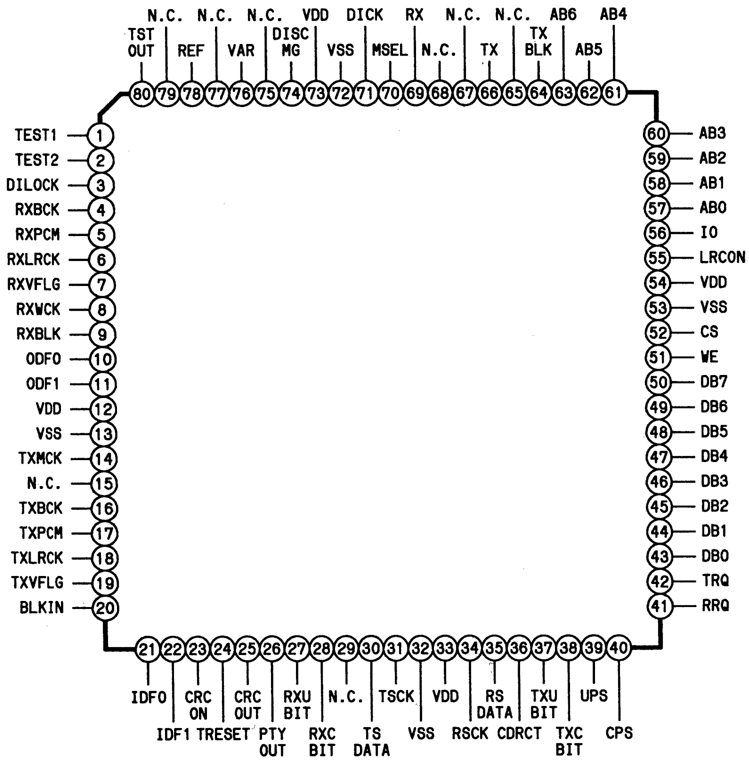
L7A0343 (OUTER ECC DECODER)
(160 PIN QFP)

(TOP VIEW)



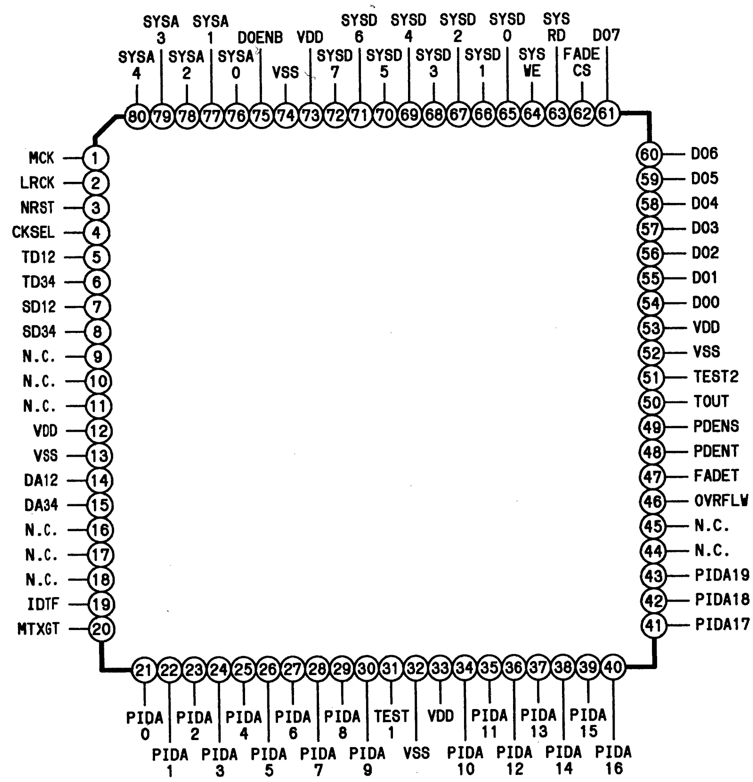
L7A0541
(80PIN QFP)

(TOP VIEW)



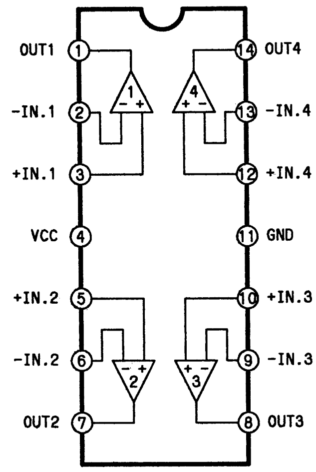
L7A0651
(80PIN QFP)

(TOP VIEW)



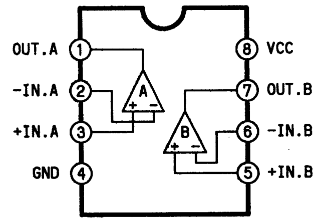
LM2902
(4 INPUTS SIGNAL SOURCE OP AMP)

(TOP VIEW)

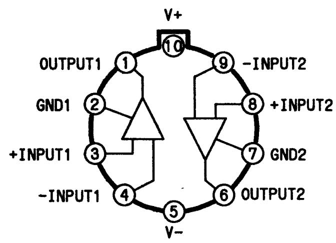


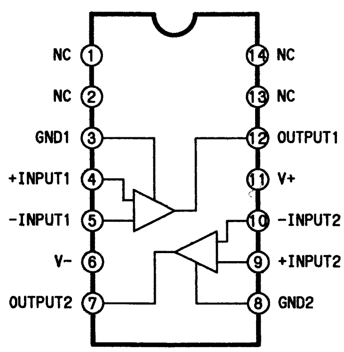
LM2904
(2 INPUTS SINGLE SOURCE OP AMP)

(TOP VIEW)



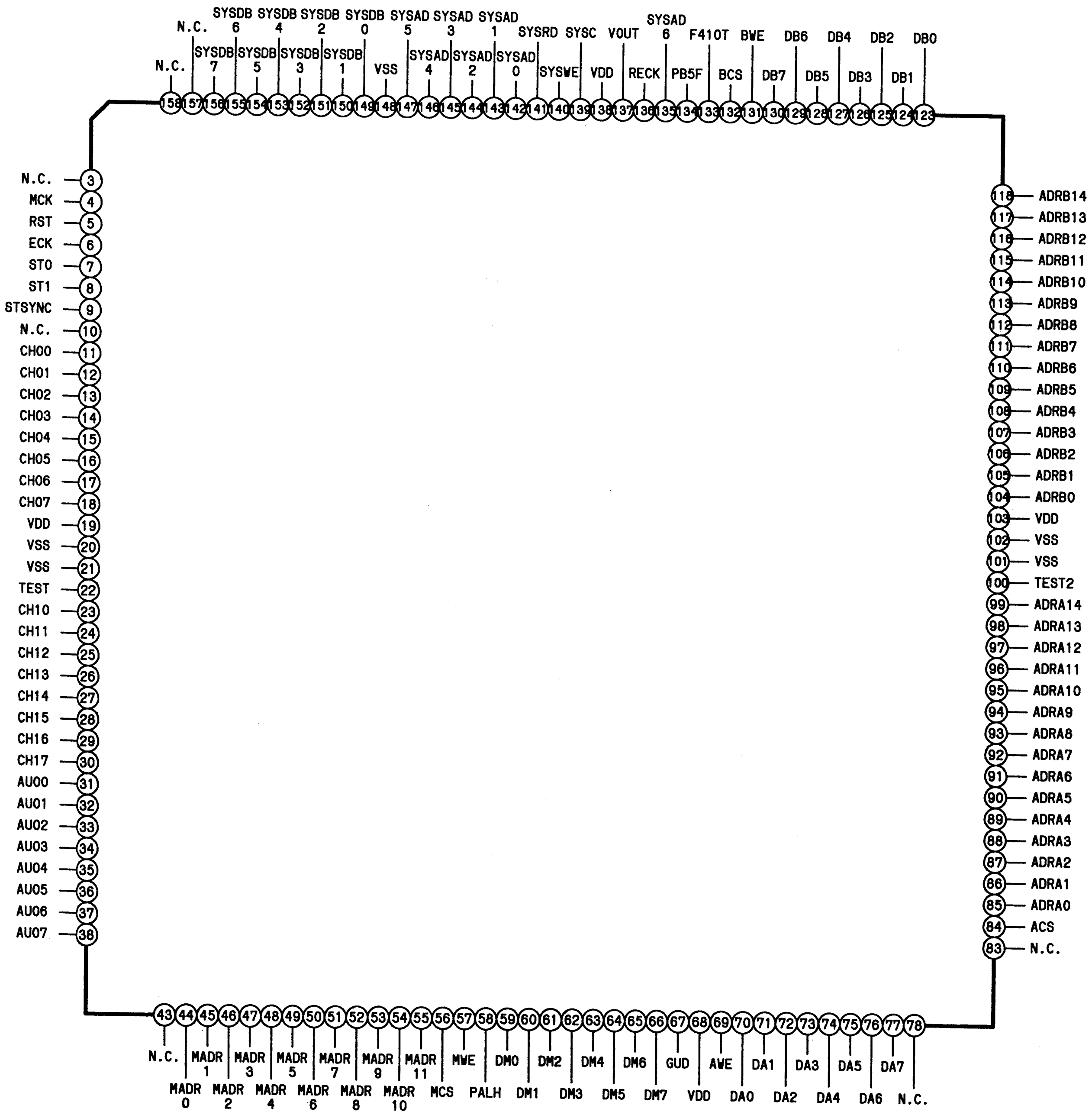
LM319
(DUAL VOLTAGE COMPARATOR)



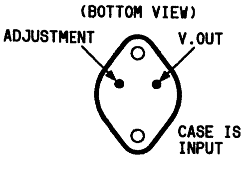


L7A0674 (PCM REC)
(160 PIN QFP)

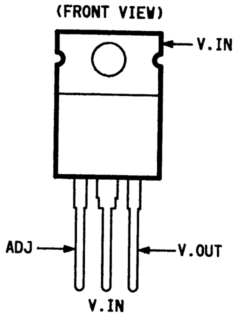
(TOP VIEW)



LM337
(BOTTOM VIEW)

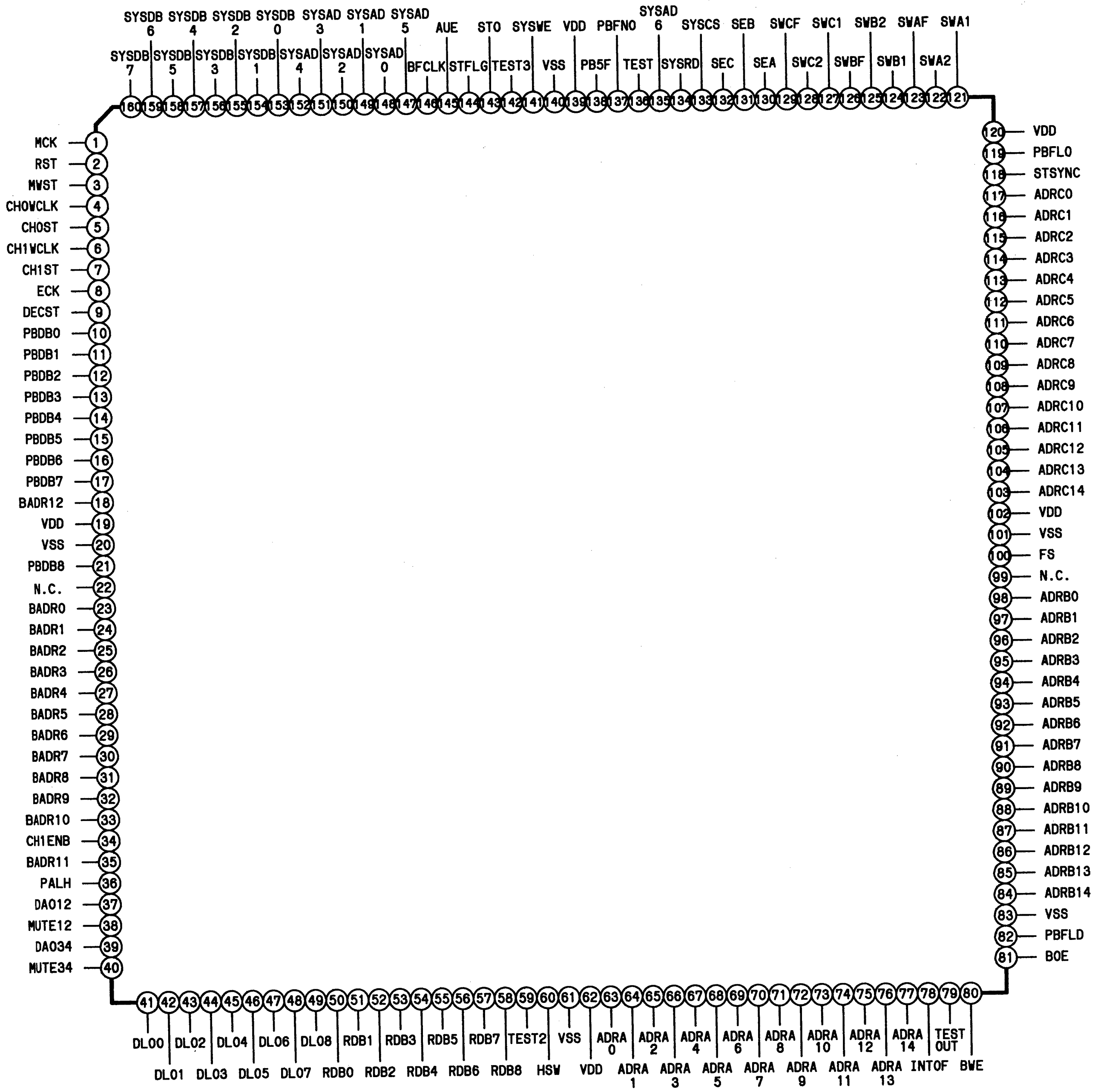


(FRONT VIEW)

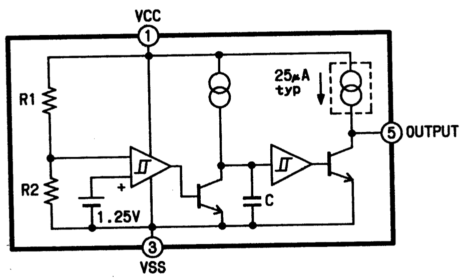


L7A0782 (AUDIO DESHUFFLE)

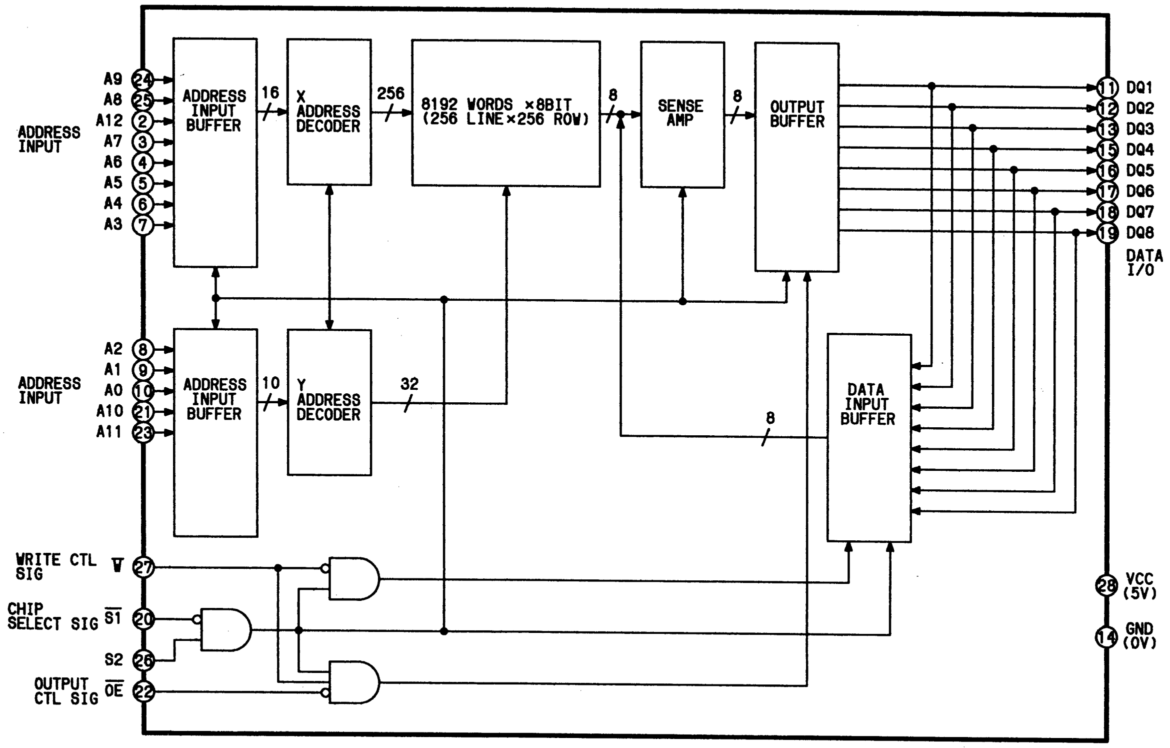
(TOP VIEW)



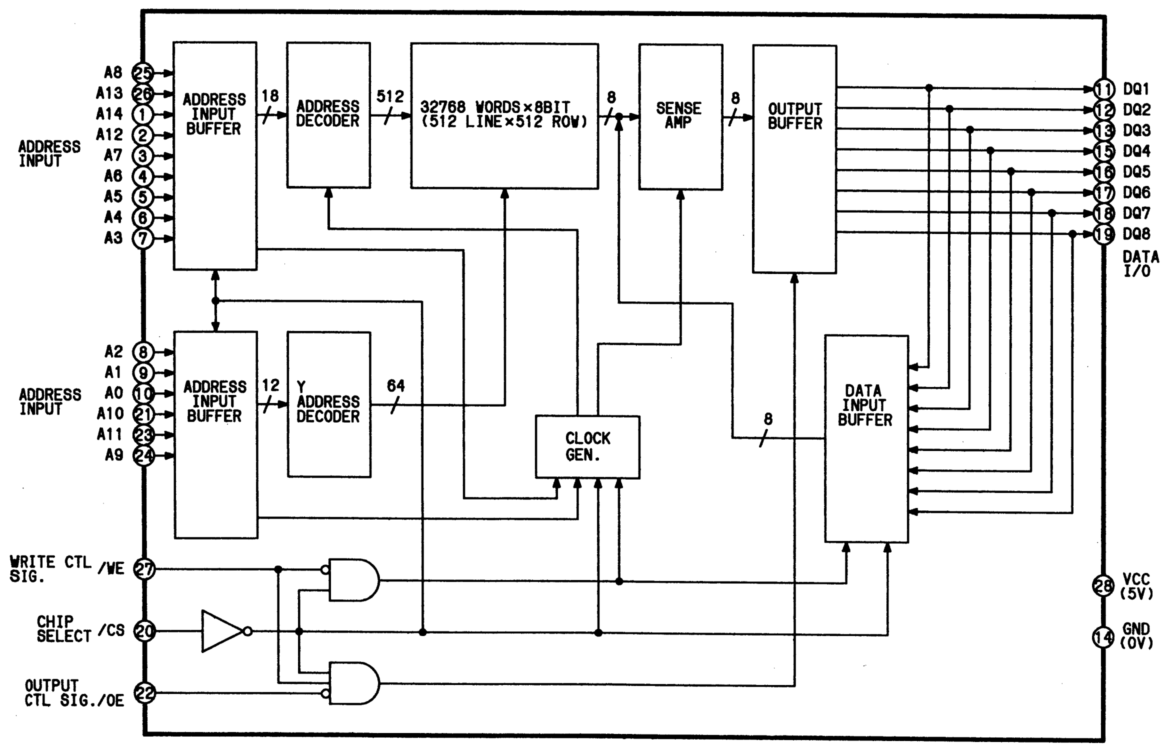
M51951
(VOLTAGE DETECTOR/DELAY CIRCUIT)



M5165FP-10L (8-BIT RAM)



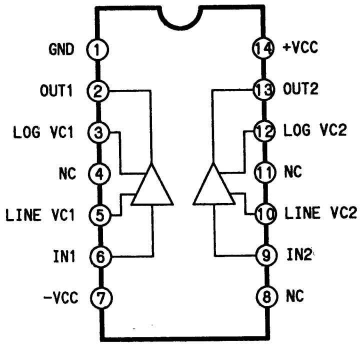
M5256BFP-70 (8-BIT RAM)



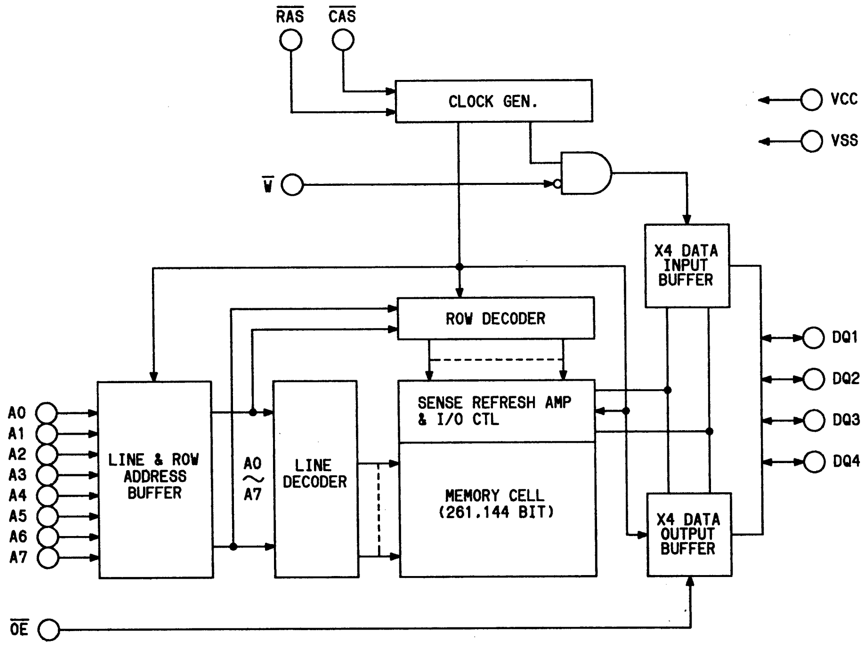
M5206P

(DUAL VCA FOR ELECTRONIC VOLUME)

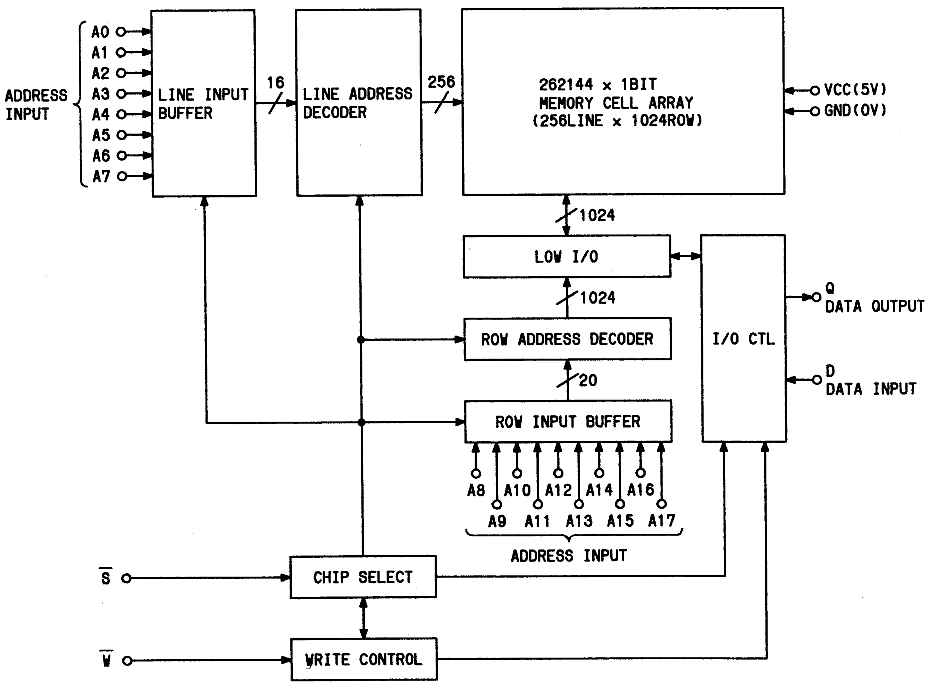
(TOP VIEW)



M5M4464AL-12

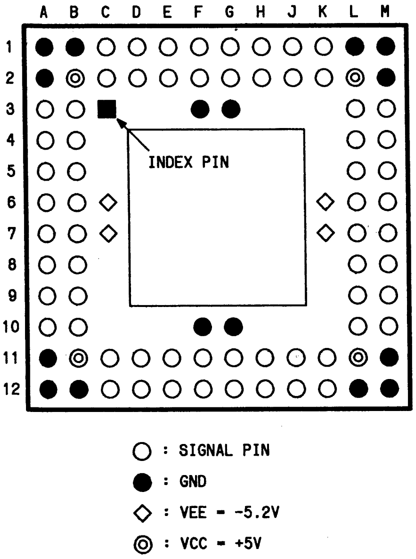


M5M5257P-35 (S-RAM)



MB121M246 (PARALLEL SERIAL CONVERTER)

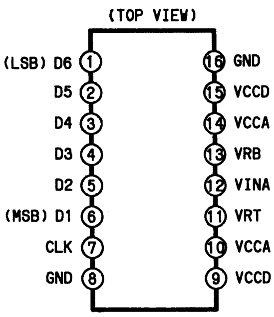
(BOTTOM VIEW)

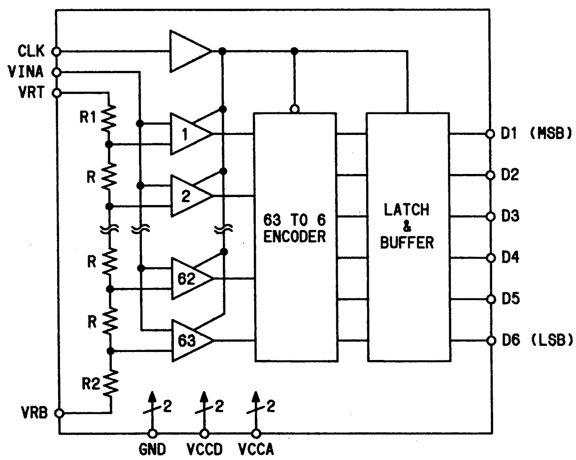


PIN NO.	I/O	PIN NAME	PIN NAME	PIN NO.	I/O	PIN NAME	PIN NAME
B10	B	BP01	AD1	F01	O	W21	A2WCLK
A10	B	BP00	AD0	E02	O	XW1	XAWCLK
B09	B	BP03	AD3	E01	O	W1	AWCLK
A09	B	BP02	AD2	D01	O	OCK1	ARECLK
A08	B	BP04	AD4	D02	O	XOK1	XARECLK
B08	B	BP05	AD5	C01	O	OS1	AREDATA
A07	B	BP06	AD6	C02	O	XOS1	XAREDATA
B07	I	ASYC	ASYIN	K11	I	XIS2	BPBDATA
B06	I	APS1	ASUPOS1	K12	I	IS2	XBPBDATA
A06	I	APS0	ASYPOS0	J11	-	IG01	IG01
B05	I	APS3	ASYPOS3	J12	-	IG02	IG02
A05	I	APS2	ASYPOS2	H12	I	CK2	BPBCLK
A04	O	S01	ASTOUT	H11	I	XCK2	XBPBCLK
B04	O	XS01	XASYOUT	G12	I	RSET	RSET
A03	O	W2T1	A2WCLKT	G11	-	IG03	IG03
B03	O	WT1	AWCLKT	F11	-	IG04	IG04
K02	O	XOS2	BREDATA	F12	I	RECL	RECL
K01	O	OS2	XBREDATA	E11	I	XCK1	XAPBCLK
J02	O	XOK2	BRECLK	E12	I	CK1	APBCLK
J01	O	OCK2	XBRECLK	D12	-	IG05	IG05
H01	O	W2	BWCLK	D11	-	IG06	IG06
H02	O	XW2	XBWCLK	C12	I	IS1	APBDATA
G01	O	W22	B2WCLK	C11	I	XIS1	XAPBDATA
G02	O	XW22	XB2WCLK	L10	B	BP11	BD1
F02	O	XW21	XA2WCLK	M10	B	BP10	BD0
L09	B	BP13	BD3	M06	I	BPS0	BSYPOS0
M09	B	BP12	BD2	L05	I	BPS3	BSYPOS3
M08	B	BP14	BD4	M05	I	BPS2	BSYPOS2
L08	B	BP15	BD5	M04	O	S02	BSYOUT
M07	B	BP16	BD6	L04	O	XS02	XBSYOUT
L07	I	BSYC	BSYIN	M03	O	W2T2	B2WCLKT
L06	I	BPS1	BSYPOS1	L03	O	WT2	BWCLKT

MB40576P (WINDOW AND ENCODER)

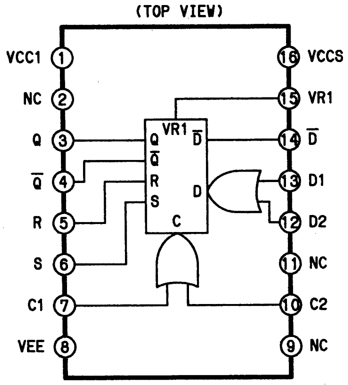
(TOP VIEW)





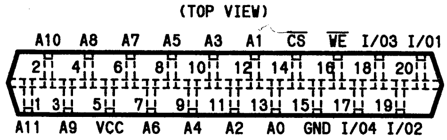
MB813AZ (LATCH)

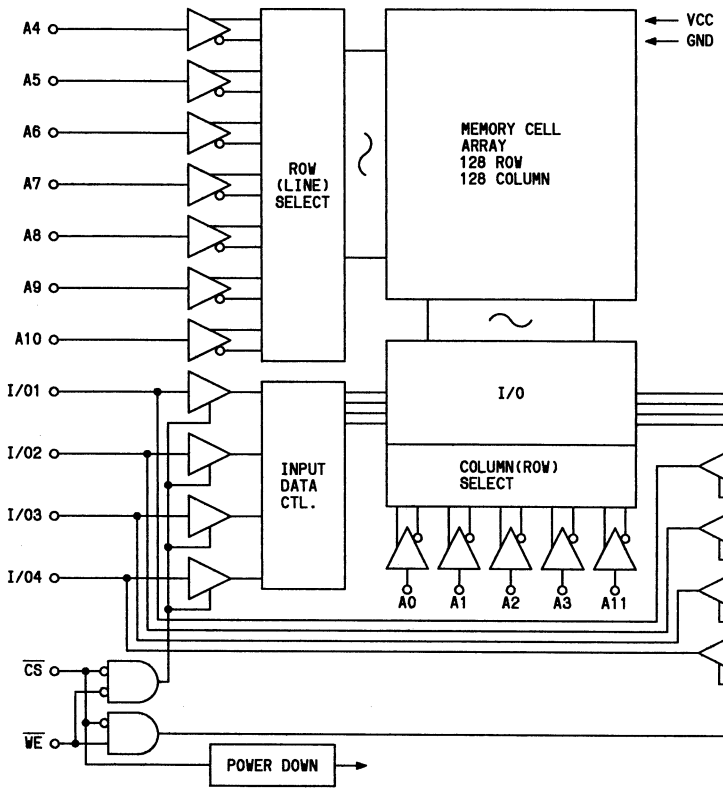
(TOP VIEW)



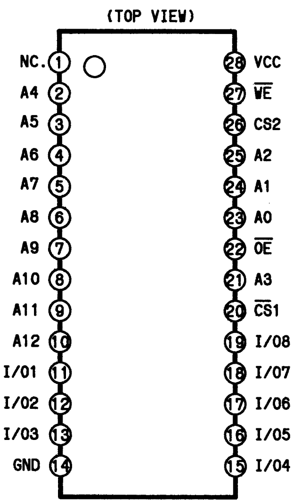
INPUT				OUTPUT	
SET S	RESET R	CLOCK C	DATA D	Q	Q̄
H	H	X	X	•	•
H	L	X	X	H	L
L	H	X	X	L	H
L	L	↑	H	H	L
L	L	↑	L	L	H
L	L	L	X	Q0	Q0

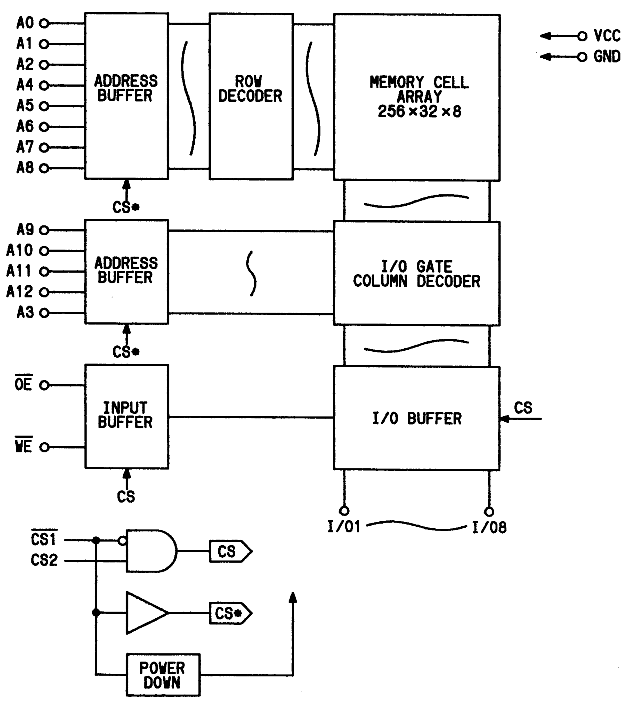
MB81C68A35PS



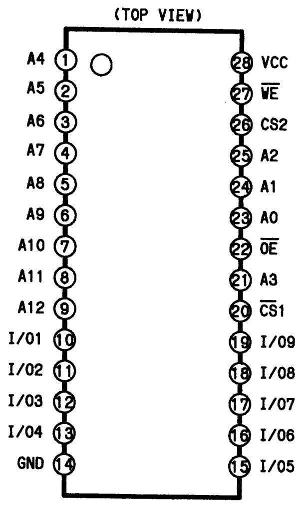


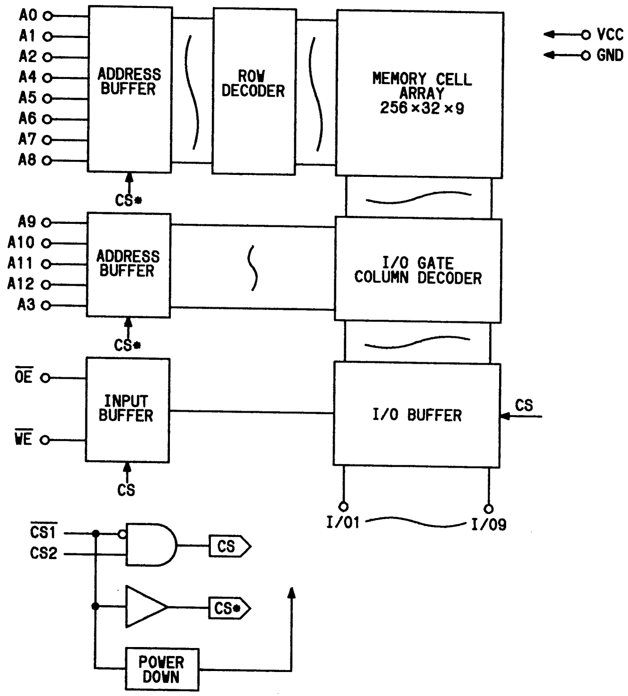
MB81C78A35PF (8K MEMORY)



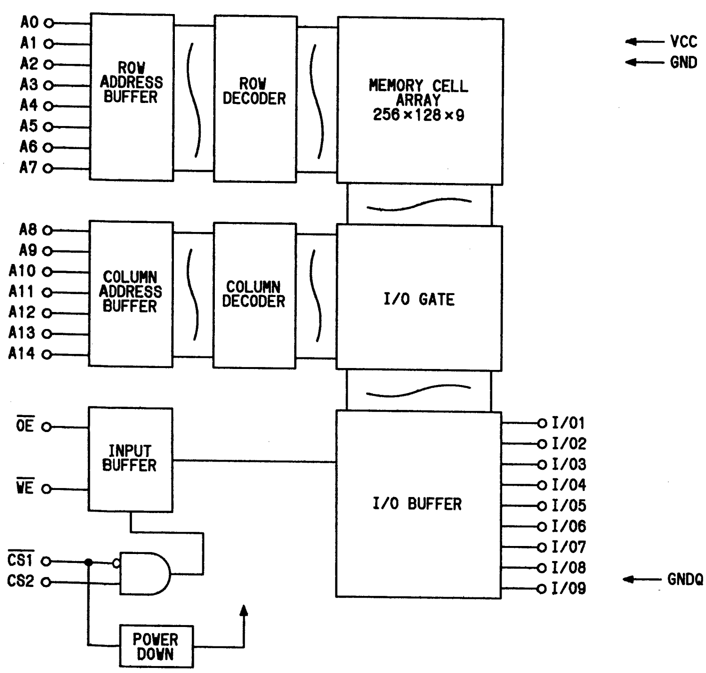


MB81C79A35PF (8K MEMORY)

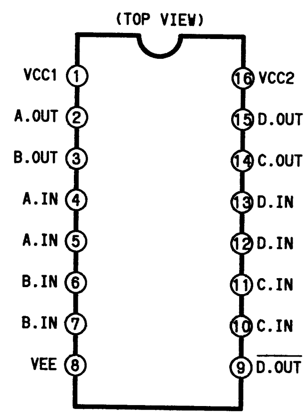




MB8289-25PF (FIELD MEMORY)

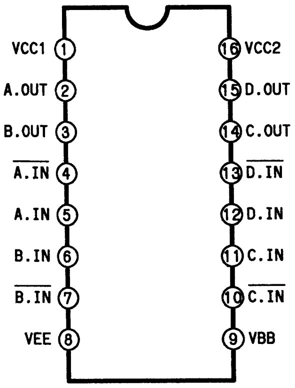


MC10104
(QUAD 2-INPUT AND GATE)

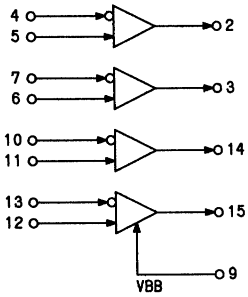


MC10115
(QUAD LINE RECEIVER)

(TOP VIEW)

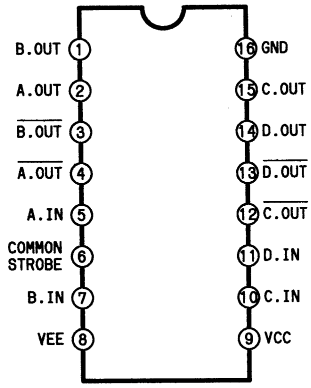


LOGIC DIAGRAM

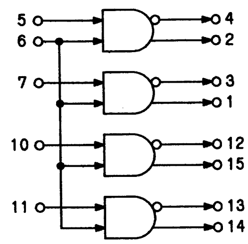


MC10124
(QUAD TTL TO MECL TRANSLATOR)

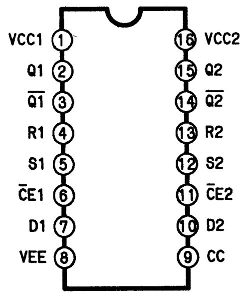
(TOP VIEW)



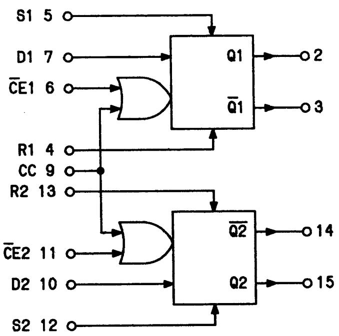
LOGIC DIAGRAM



MC10131
(DUAL TYPED MASTER-SLAVE FLIP-FLOP)



(LOGIC DIAGRAM)



CLOCKED TRUTH TABLE

C	D	QN-1
L	ϕ	QN
H	L	L
H	H	H

ϕ -DON'T CARE
C -CE+CC
A CLOCK H IS A CLOCK TRANSITION FROM A LOW TO A HIGH STATE.

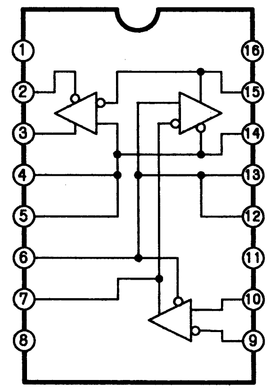
R-S TRUTH TABLE

R	S	QN-1
L	L	QN
L	H	H
H	L	L
H	H	N.D.

N.D.-NOT DEFINED

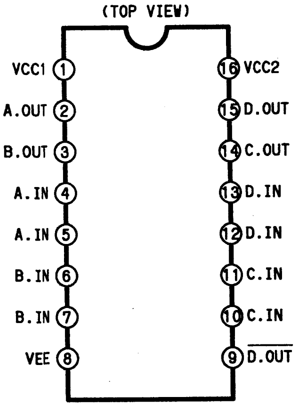
MC10116
(TRIPLE DIFFERENTIAL LINE RECEIVER)

(TOP VIEW)



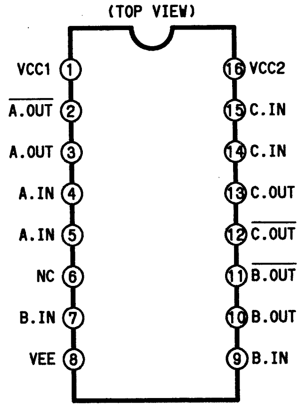
MC10H102
(QUAD 2-INPUT NOR GATE)

(TOP VIEW)



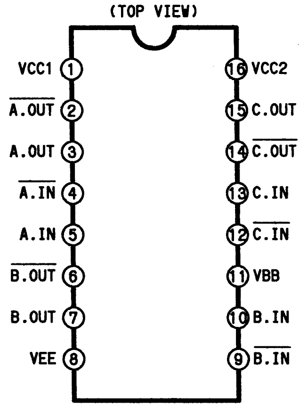
MC10H107
(TRIPLE 2-INPUT EXCLUSIVE "OR"/EXCLUSIVE "NOR")

(TOP VIEW)

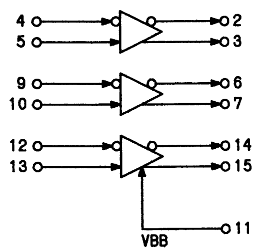


MC10H116
(TRIPLE LINE RECEIVER)

(TOP VIEW)

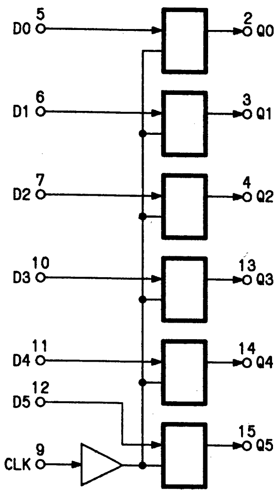


LOGIC DIAGRAM



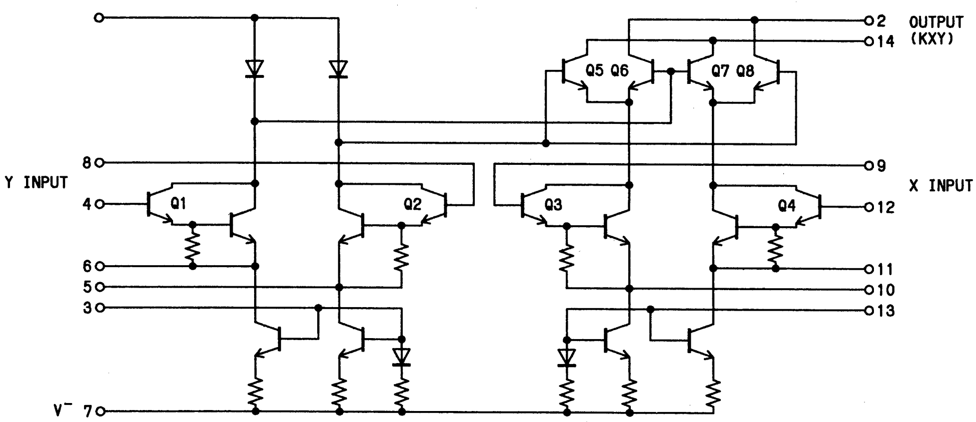
MC10H176
(HEX "D" MASTER-SLAVE FLIP-FLOP)

LOGIC DIAGRAM

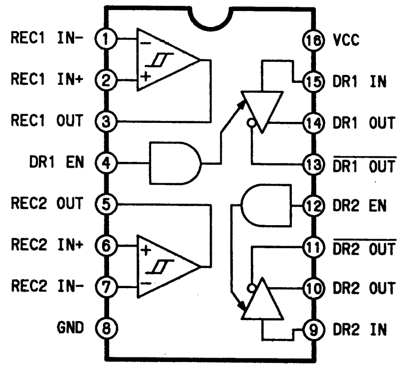


VCC1-PIN1
VCC2-PIN16
VEE-PIN8

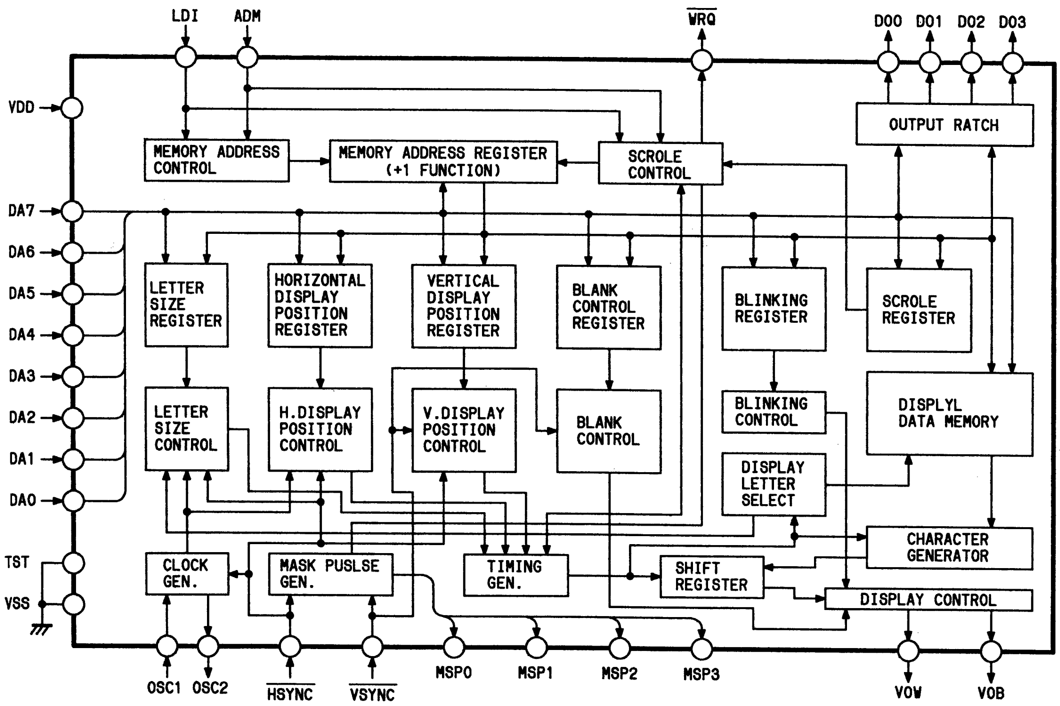
MC1495L
(ANALYSIS AND BASIC OPERATION)



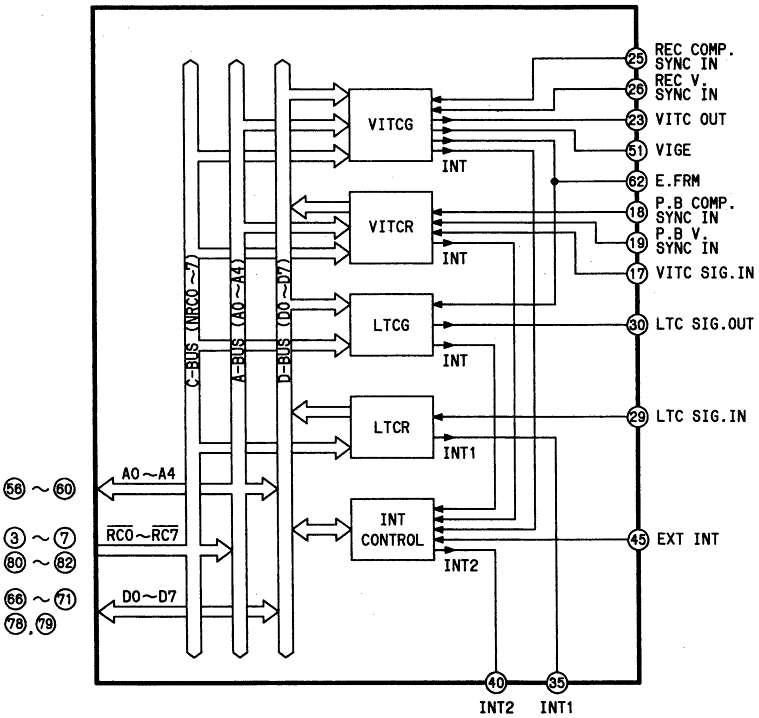
MC34051
(DUAL RS-422/423 TRANSCEIVER)



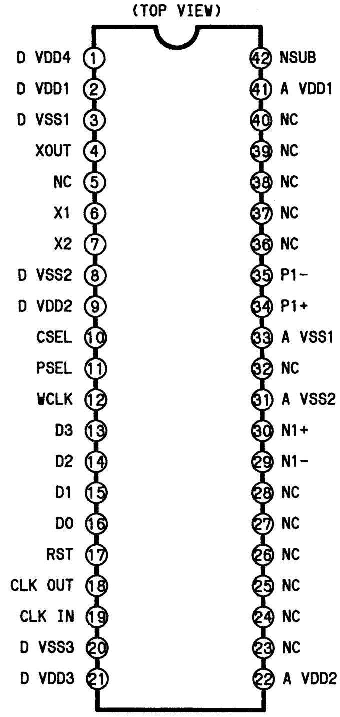
MN1287 (CHARACTOR GENERATOR)

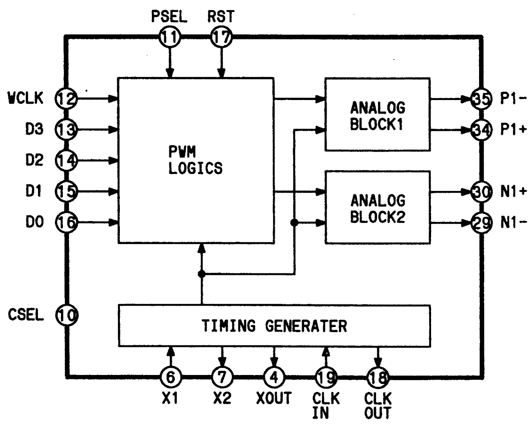


MN51040
(TIME CODE GENERATOR/READER)

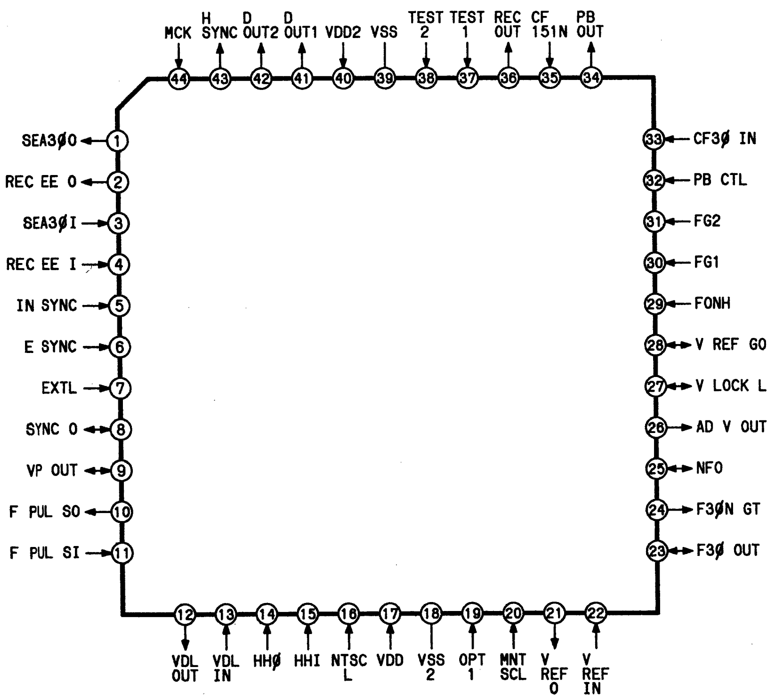


MN64731 (PWM D/A)



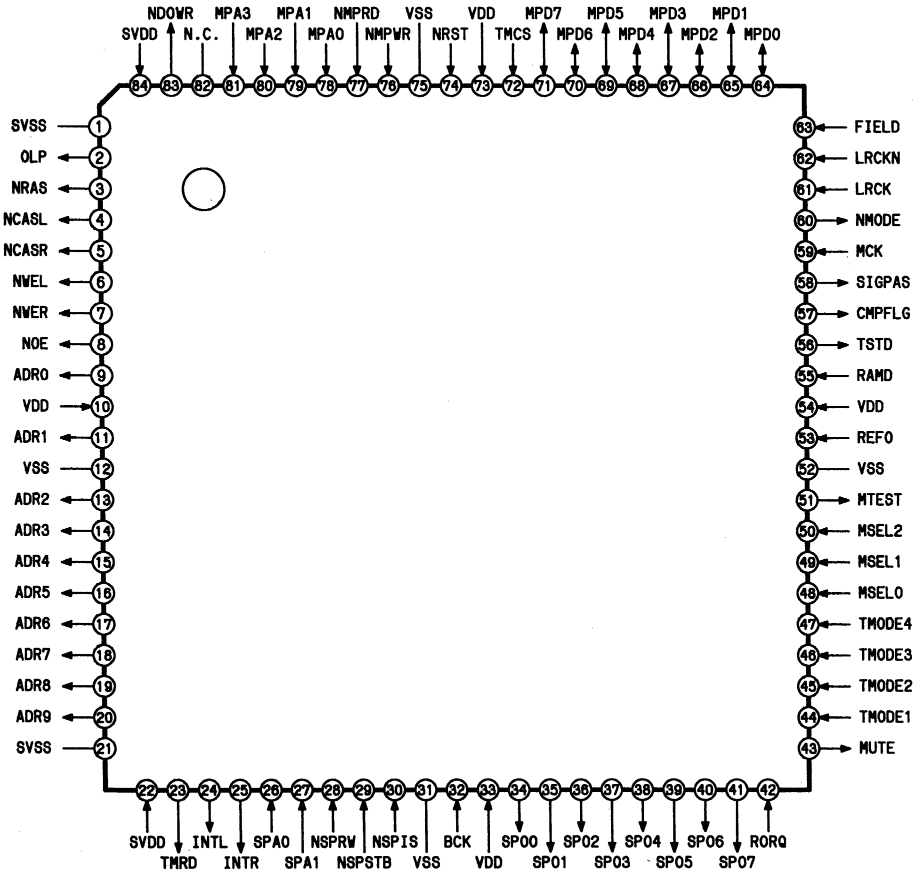


MN53015VZW
(1500 GATES C-MOS GATE ARRAY)



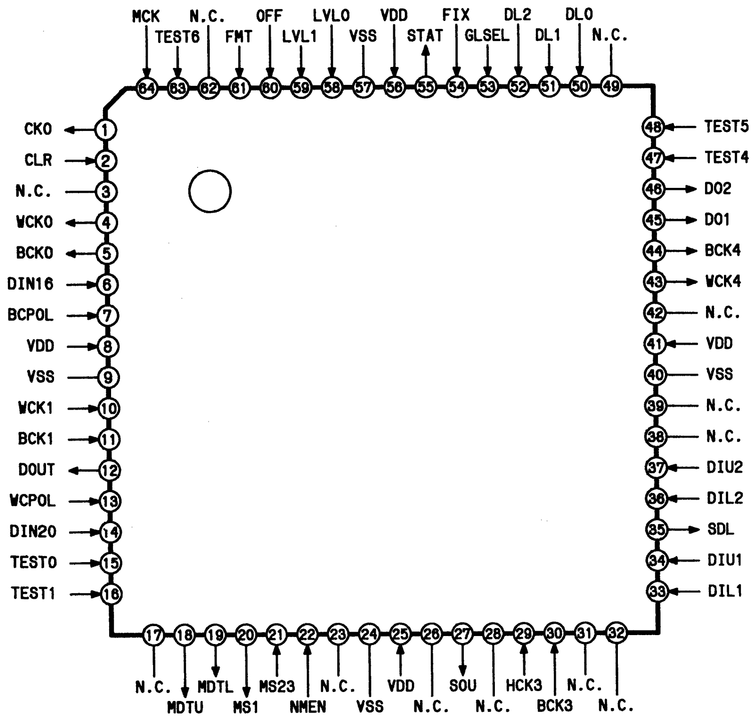
MN53040VPS (SELECTOR)

(TOP VIEW)



MN53040VPQ (SELECTOR FOR A/D CONVERTER)

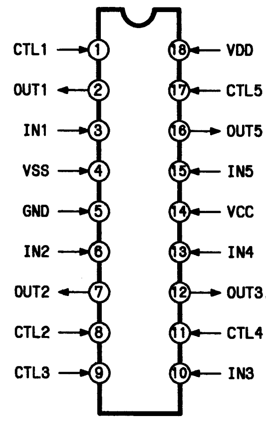
(TOP VIEW)

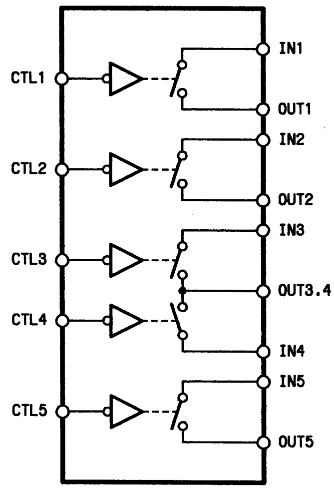


MN6631

(5-CHANNEL CMOS ELECTRONIC SWITCH)

(TOP VIEW)

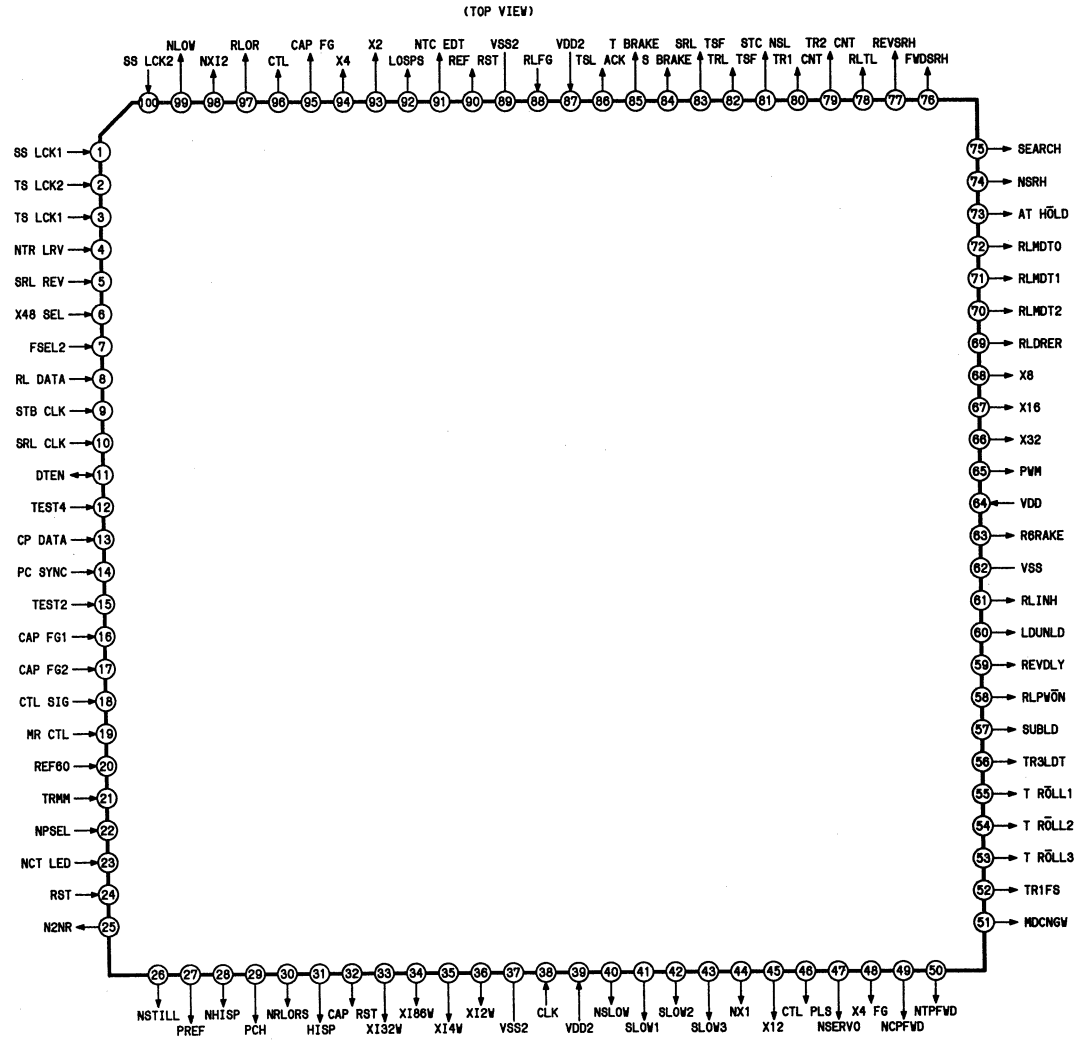




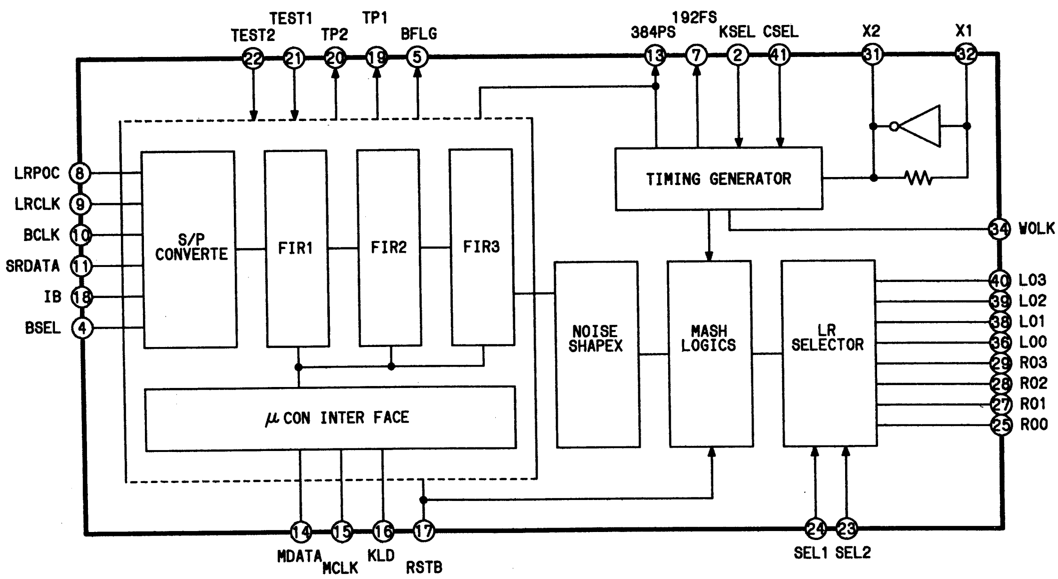
FUNCTION TABLE

INPUT	SWITCH
L	ON
H	OFF

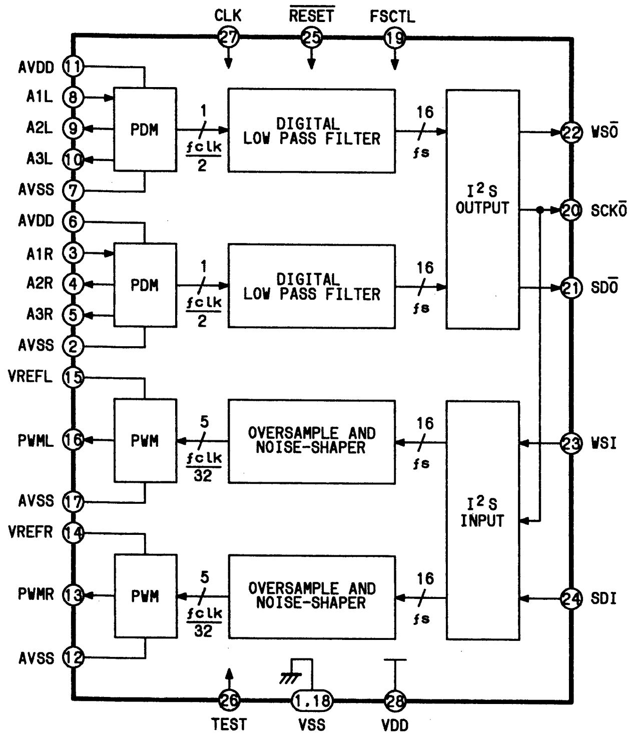
MN53030VYA (CONTROL FOR JOG)



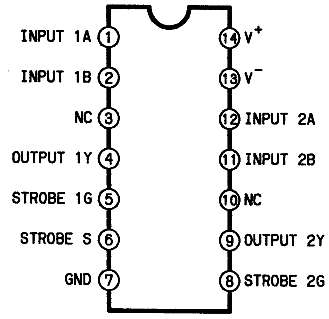
MN64730 (DIGITAL ATTENUATOR)

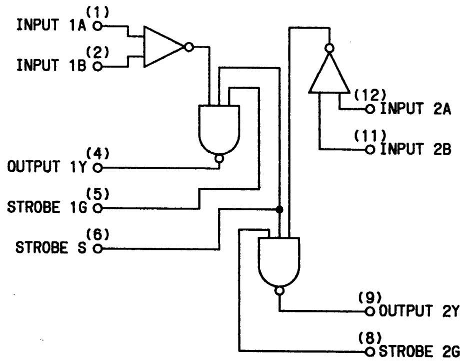


MN8305S (INTERPOLATION FOR JOG)

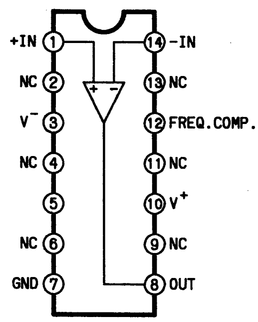


NE521
(HIGH SPEED DUAL DIFFERENTIAL COMPARATOR)

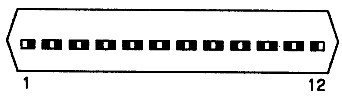




NE5539
(ULTRA HIGH FREQUENCY OPERATIONAL AMPLIFIER)
(TOP VIEW)

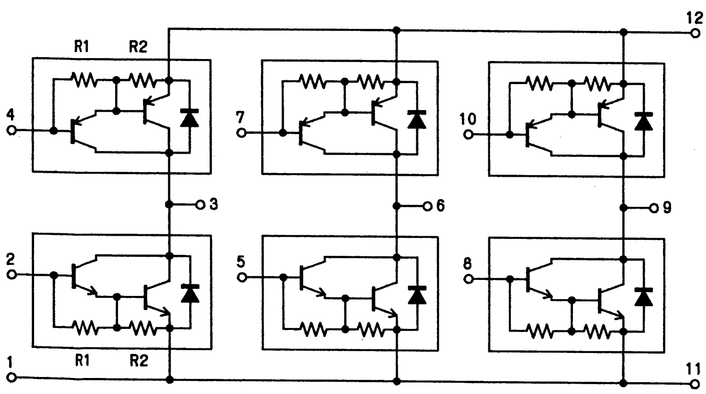


MP6901
(HIGH POWER SWITCHING)



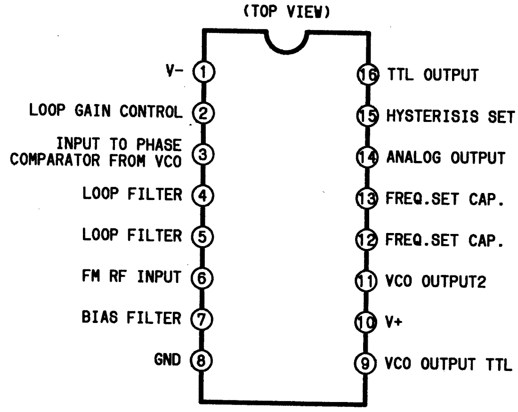
1.11.12	EMITTER
2.4.5.7.8.10	BASE
3.6.9	COLLECTOR

EQUIVALENT CIRCUIT

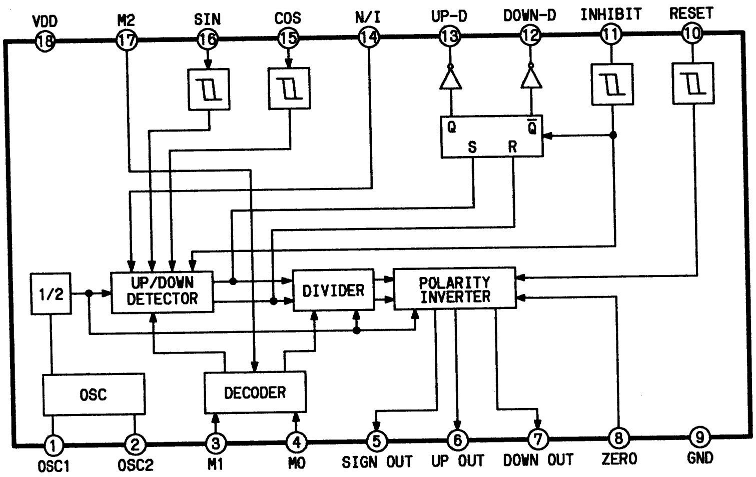


R1≈4.5KΩ R2≈300Ω

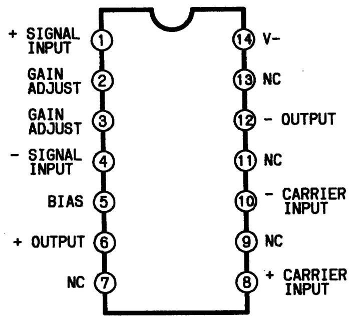
NE564
(PHASE LOCKED LOOP)
(TOP VIEW)

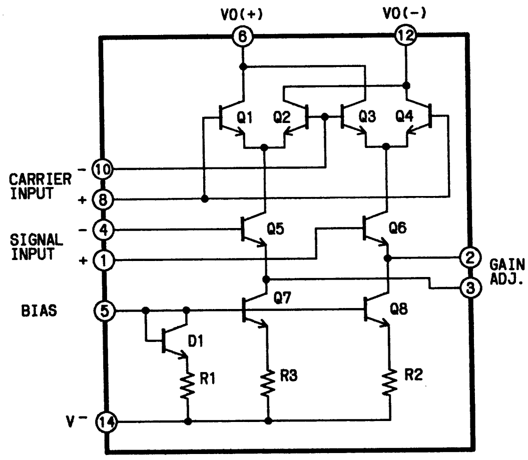


MSM5210RS (UP/DOWN COUNTER)

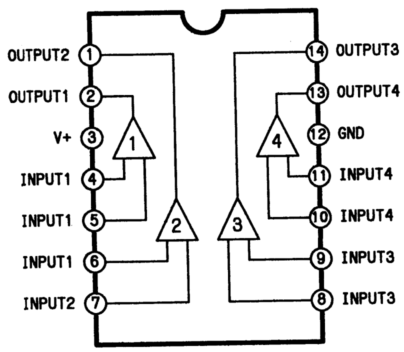


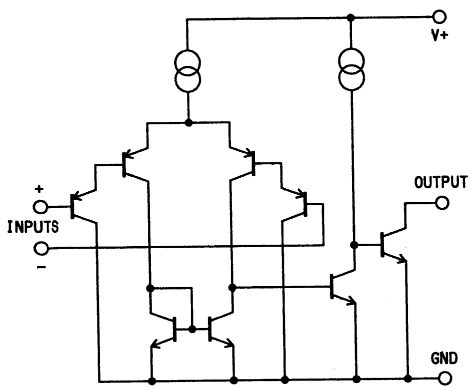
NJM1496
(BALANCED MODULATOR/DEMODULATOR)



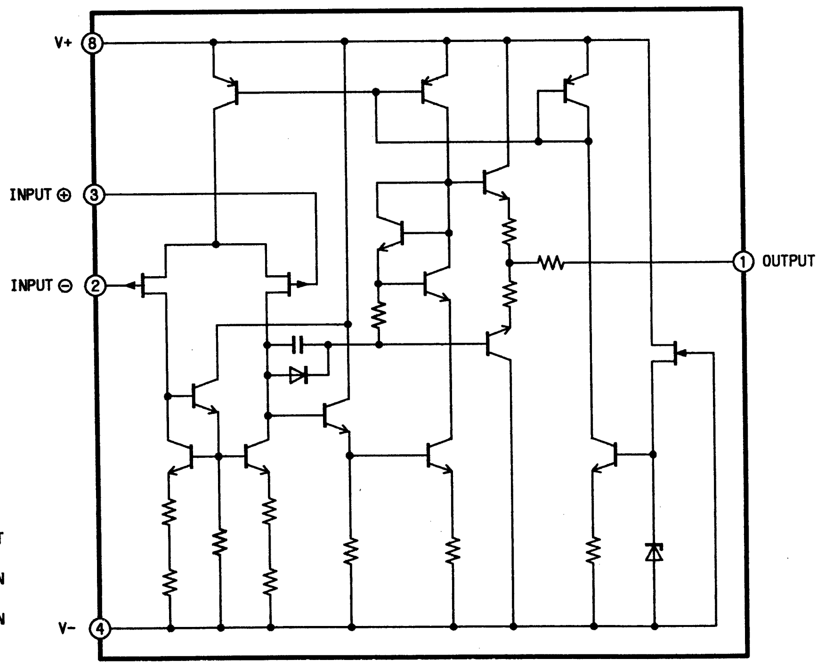


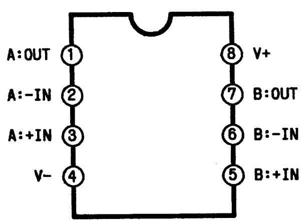
NJM2901
(QUAD VOLTAGE COMPARATOR)
(TOP VIEW)



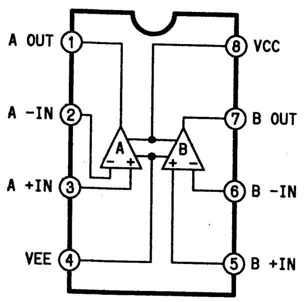


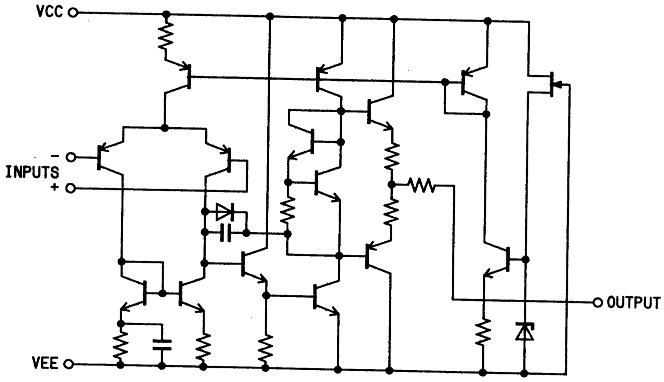
NJM082BM
(OPERATIONAL AMPLIFIER)



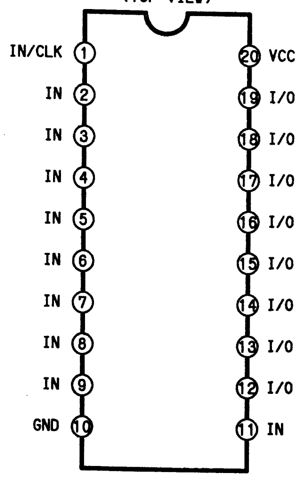


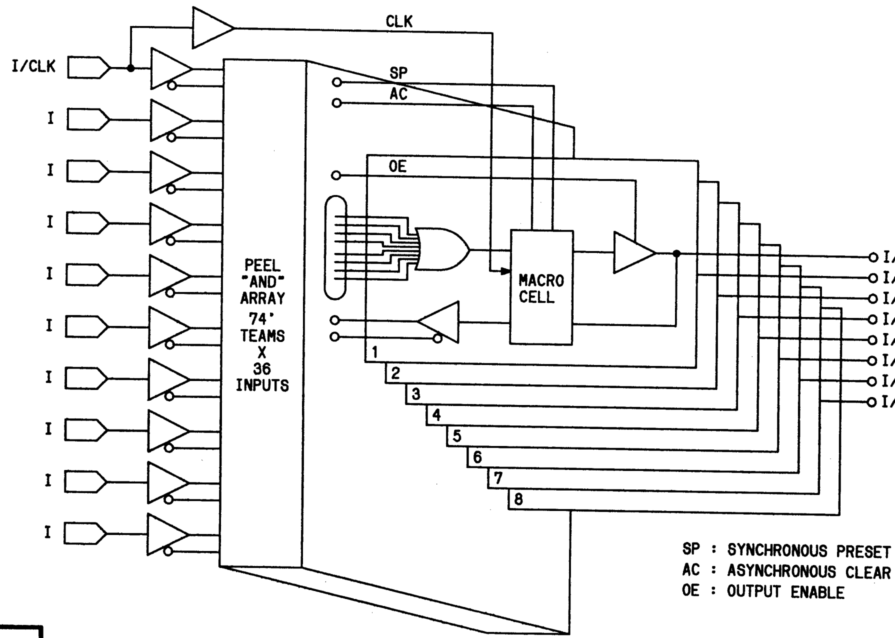
NJM4558
(OPERATIONAL AMPLIFIER)
(TOP VIEW)





PEEL18CV8 (C-MOS EPROM)
(TOP VIEW)

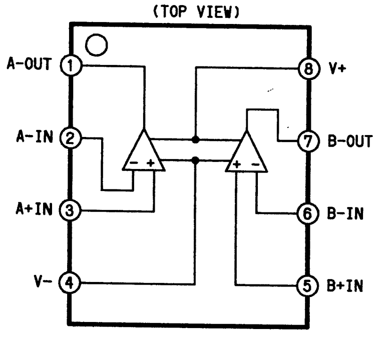




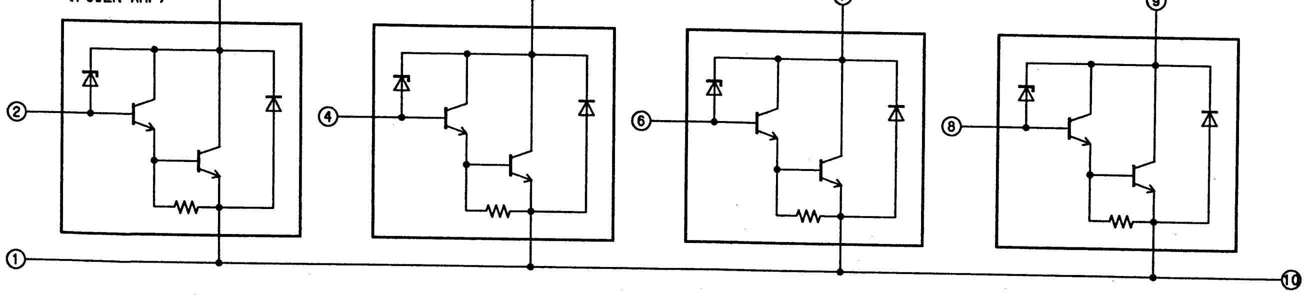
SP : SYNCHRONOUS PRESET
AC : ASYNCHRONOUS CLEAR
OE : OUTPUT ENABLE

NJM5532
(2 CIRCUIT LOW NOISE AMP)

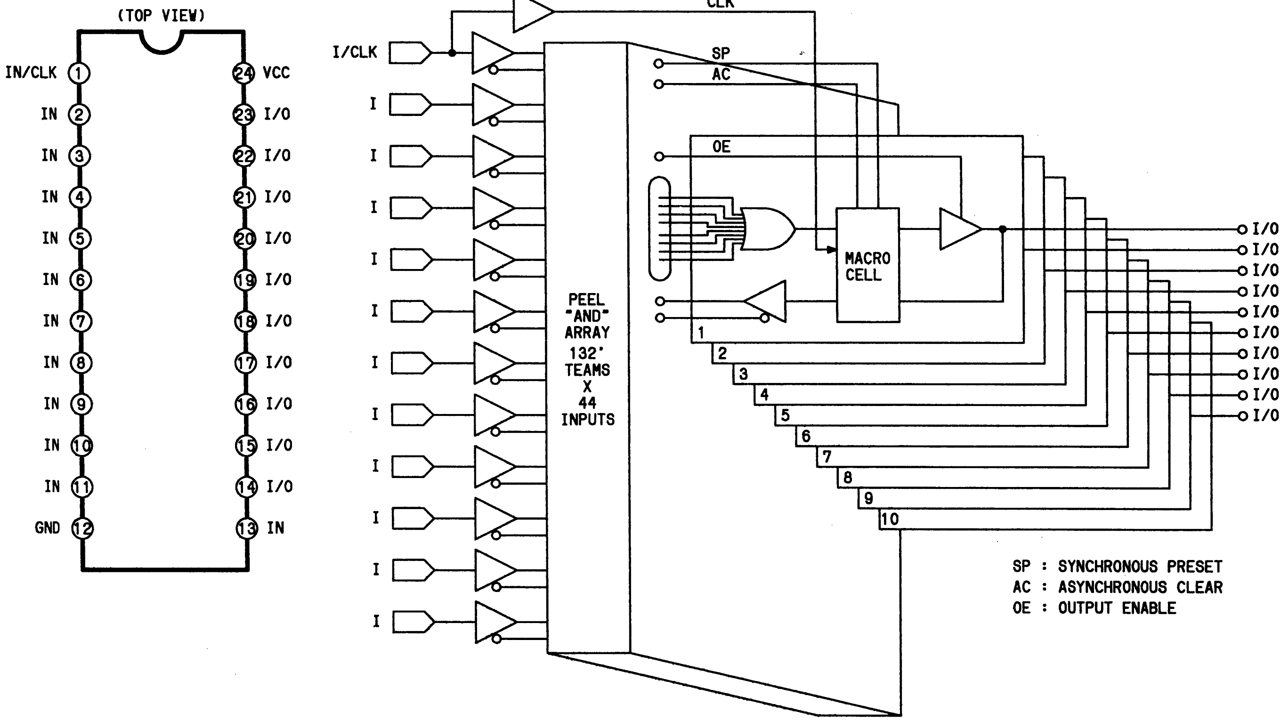
(TOP VIEW)



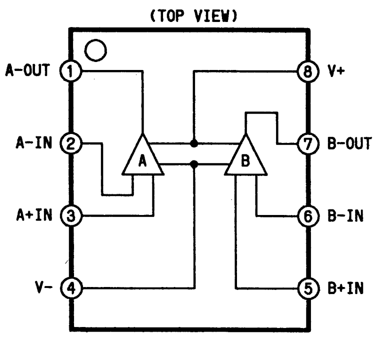
PU4124
(POWER AMP)



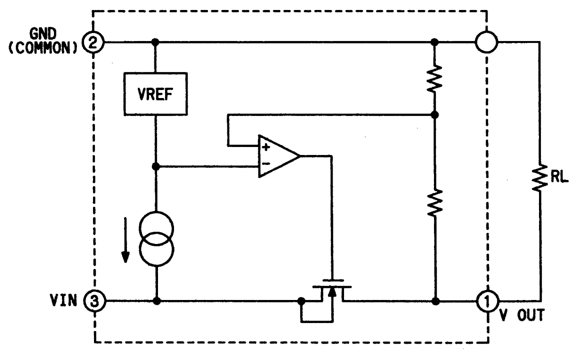
PEEL22CV10 (C-MOS EPROM)



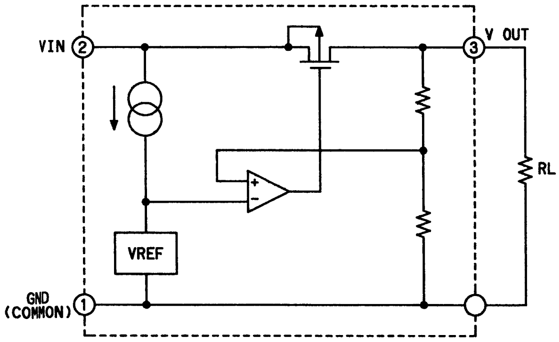
RC4560MD



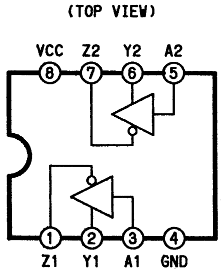
S-80230AG
(C-MOS VOLTAGE REGULATOR)



S81250HG
(C-MOS VOLTAGE REGULATOR)

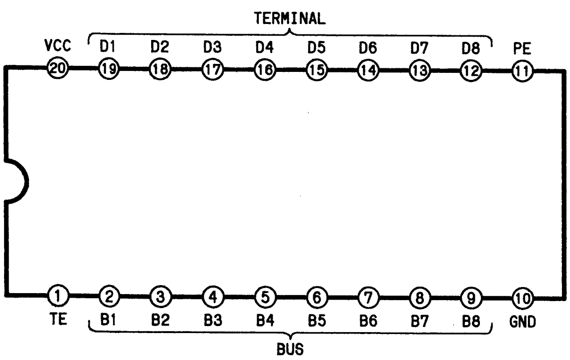


SN75158



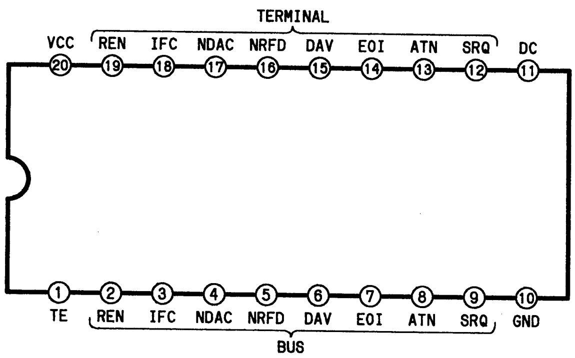
SN75160 (GPI INTERFACE)

(TOP VIEW)



SN75161 (GPI INTERFACE)

(TOP VIEW)



(FUNCTION TABLES)

DRIVERS

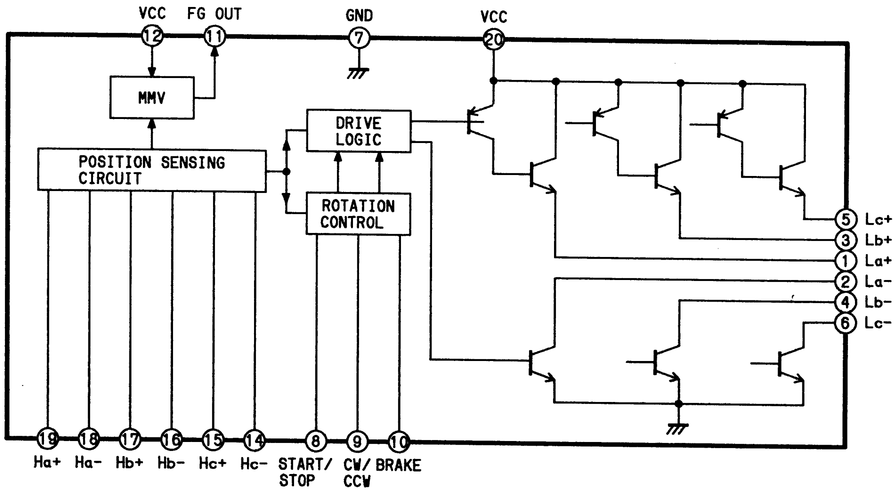
INPUTS			OUTPUT
D	TE	PE	B
H	H	H	H
L	H	H	L
H	X	L	F
L	H	L	L
X	L	X	F

RECEIVERS

INPUTS			OUTPUT
B	TE	PE	D
L	L	X	L
H	L	X	H
X	H	X	Z

TA7712

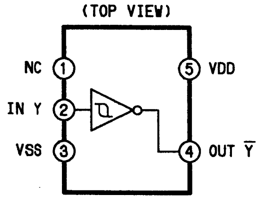
(MOTOR CONTROL IC)

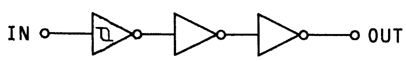


TC4S584F

(SCHMITT TRIGGER)

(TOP VIEW)

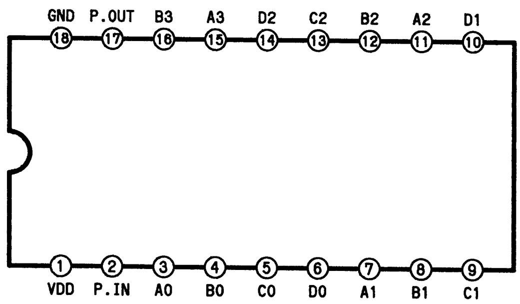


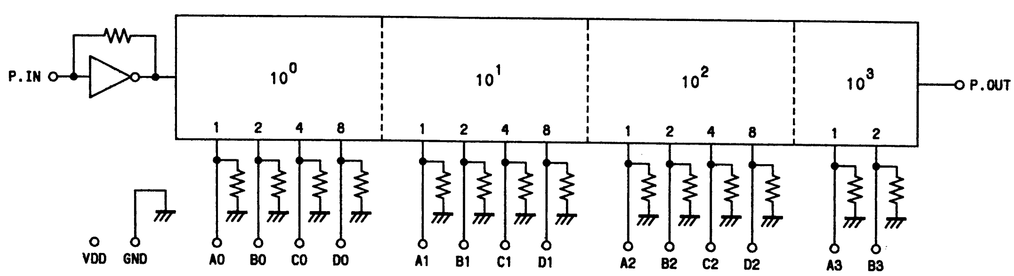


TC9122P

(HIGH SPEED BCD PROGRAMMABLE COUNTER)

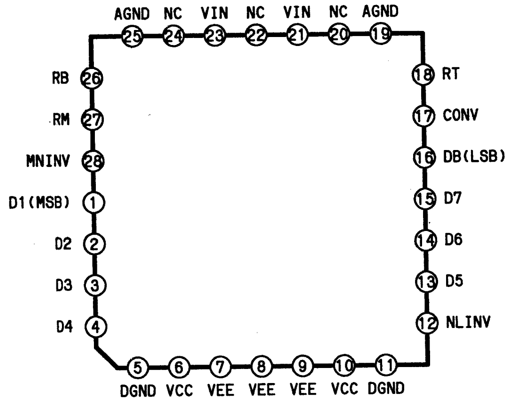
(TOP VIEW)



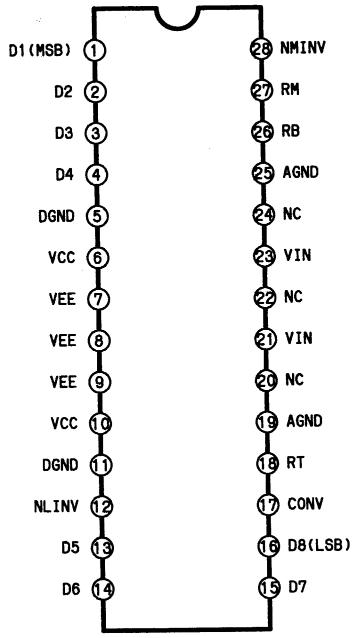


TDC1038
(MONOLITHIC VIDEO A/D CONVERTER)

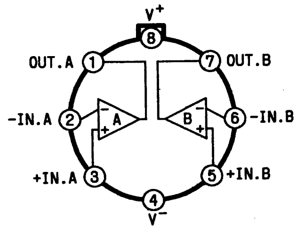
(TOP VIEW)

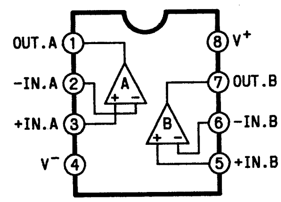


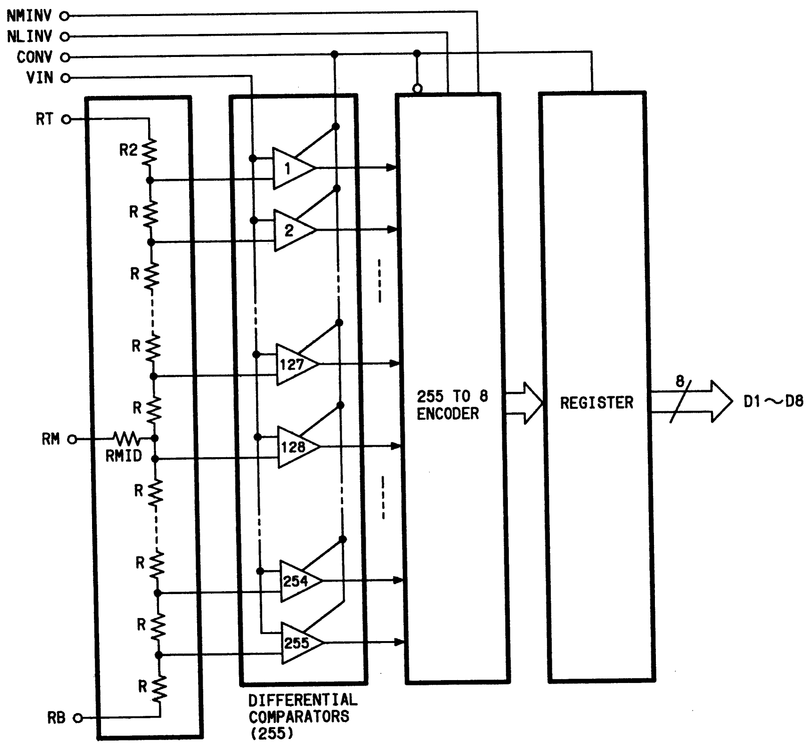
(TOP VIEW)



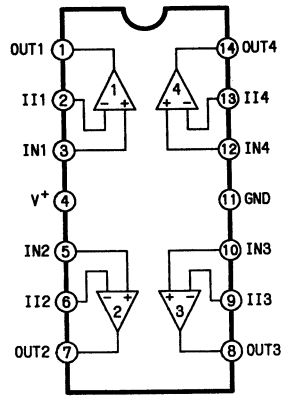
TL082
(OPERATIONAL AMPLIFIER)
(TOP VIEW)



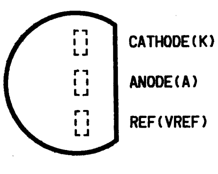




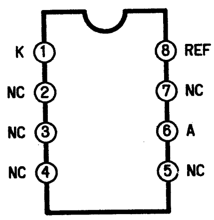
TL084
(OPERATIONAL AMPLIFIER)
(TOP VIEW)



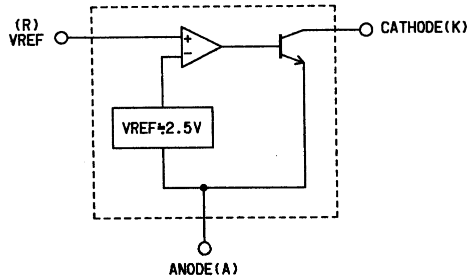
TL431
(ADJUSTABLE PRECISION SHUNT REGULATOR)



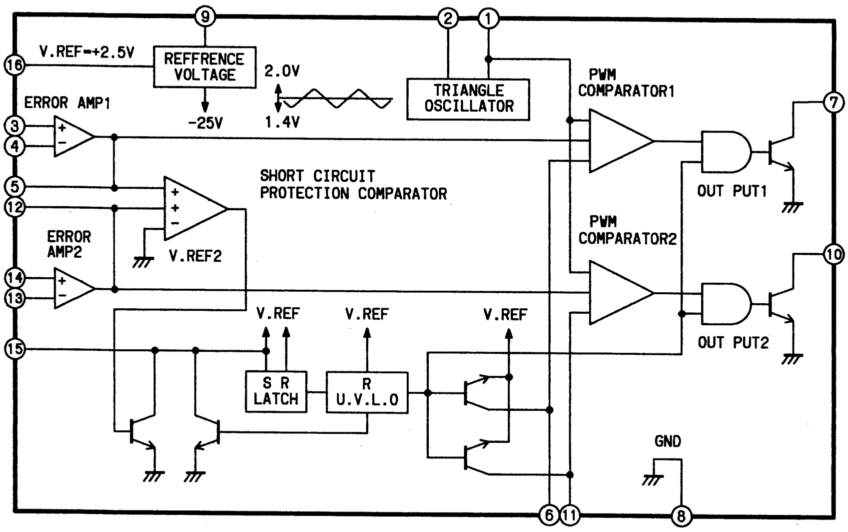
LP
LPB



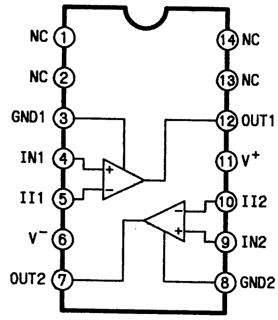
JG
P
PS



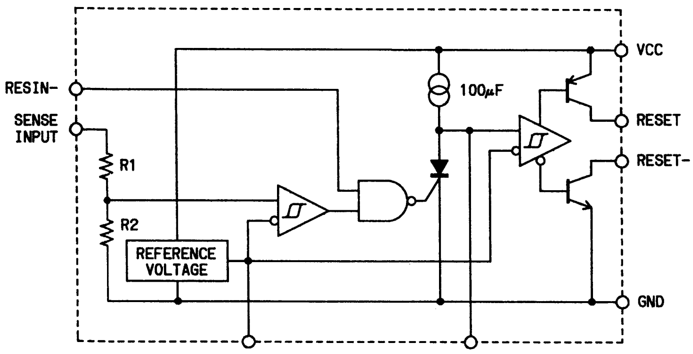
TL1451CNS
(DUAL SWITCHING REGULATOR CONTROLLER)



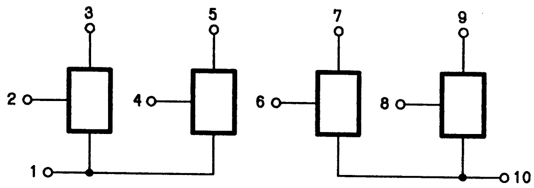
UPC319
(DUAL COMPARATOR)
(TOP VIEW)



TL7705
(SUPPLY VOLTAGE SUPERVISOR CIRCUIT)

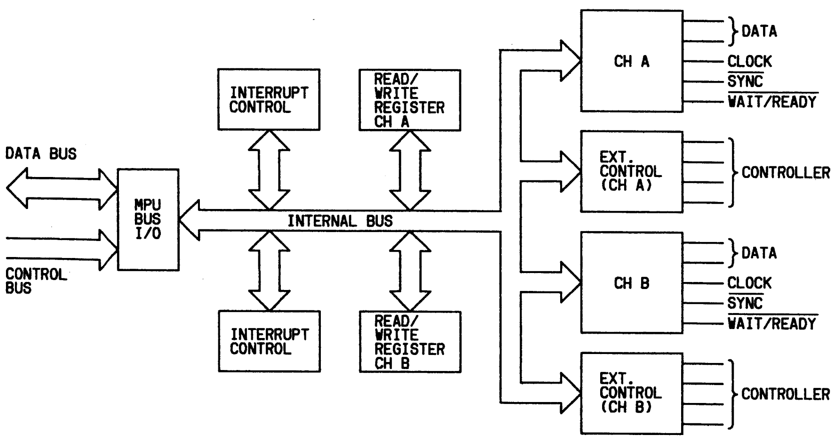


***μ*PA1453H**
(POWER TRANSISTOR ARRAY)

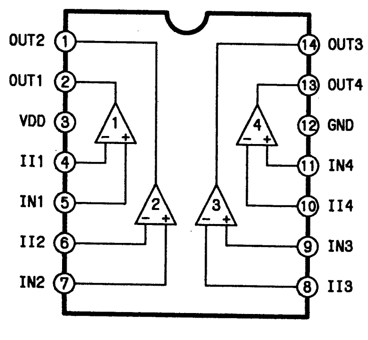


BASE:2.4.6.8
COLLECTOR:3.5.7.9
EMITER:1.10

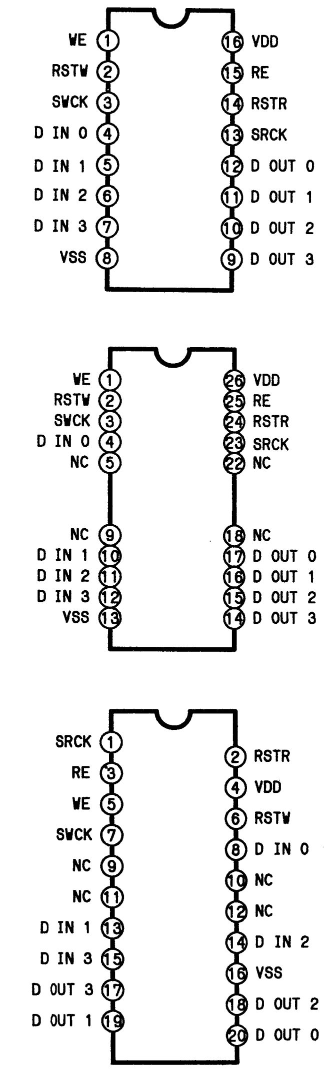
TMPZ84C43AF6
(SERIAL INPUT/OUTPUT CONTROLLER)

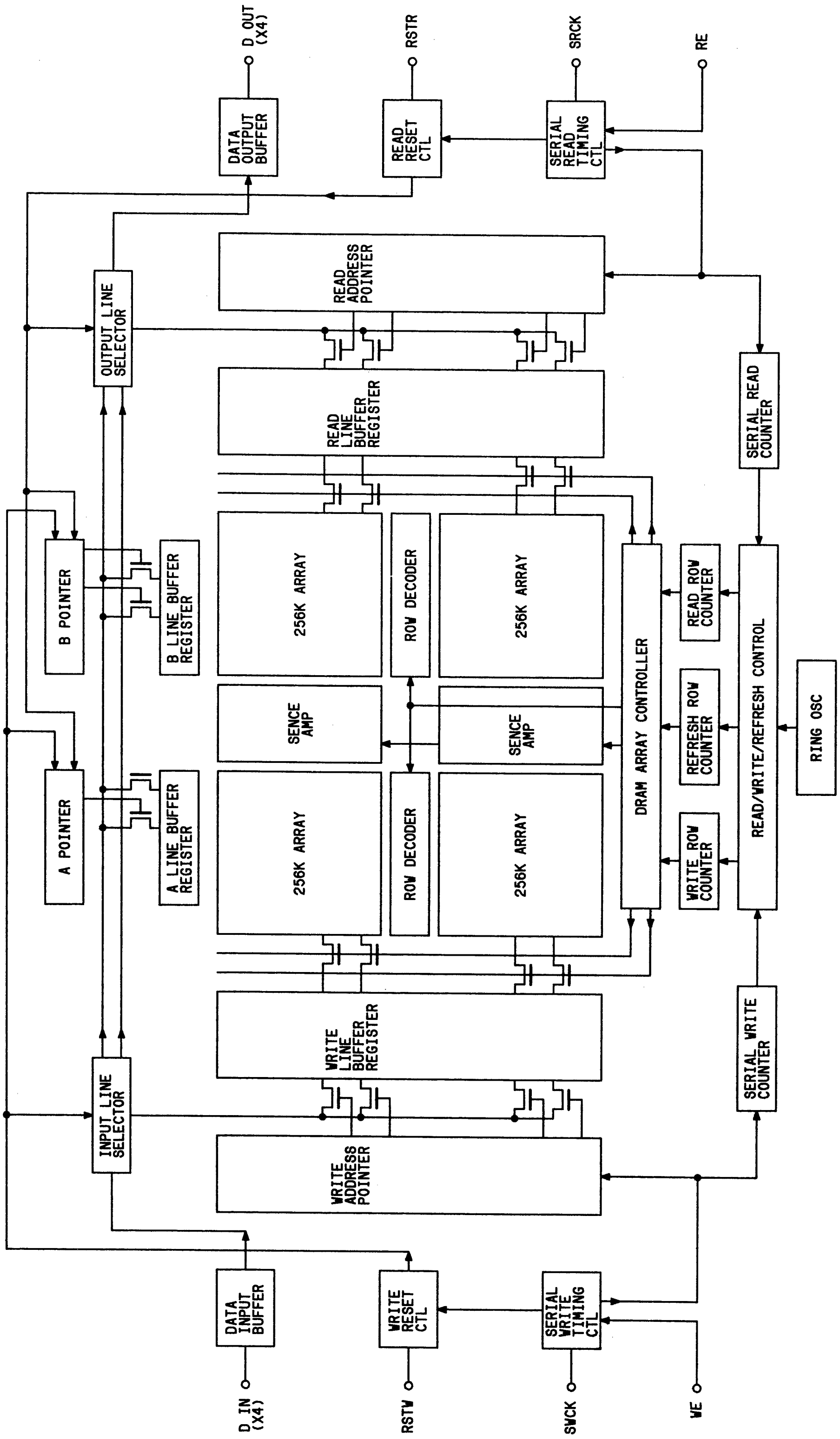


UPC339
(OPERATIONAL AMPLIFIER)
(TOP VIEW)

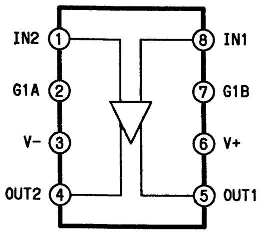


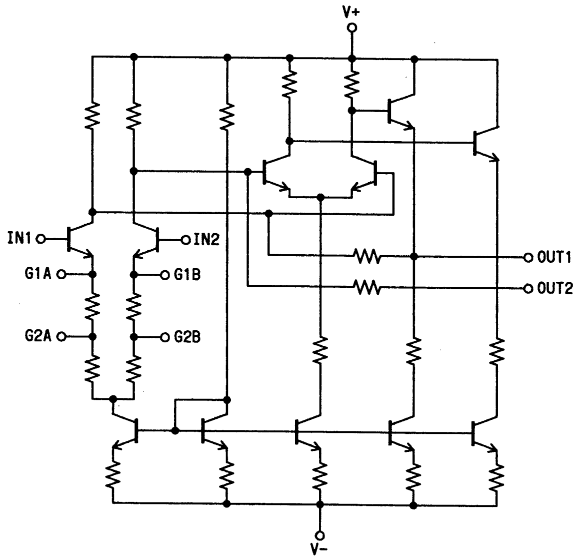
TMS4C1060 (CONCEALMENT CONTROL)
(262.144 WORDS×4BIT-FIELD-MEMORY)





µPC1663

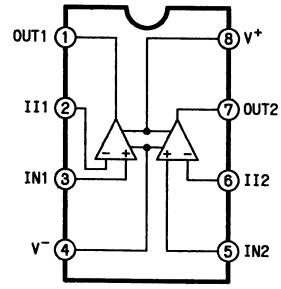




UPC393

(DUAL SINGLE-SUPPLY OPERATIONAL AMPLIFIER)

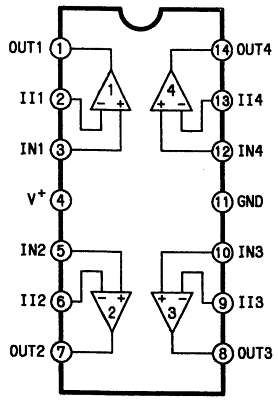
(TOP VIEW)



UPC451

(HIGH PERFORMANCE QUADRUPLE OPERATIONAL AMPLIFIER)

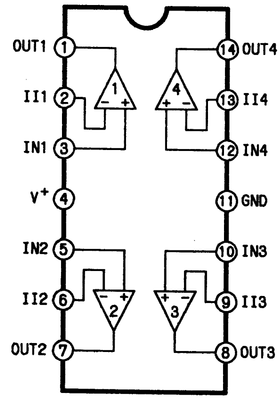
(TOP VIEW)



UPC4741

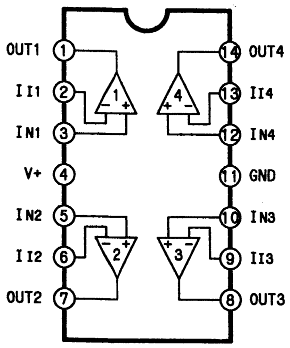
(OPERATIONAL AMPLIFIER)

(TOP VIEW)

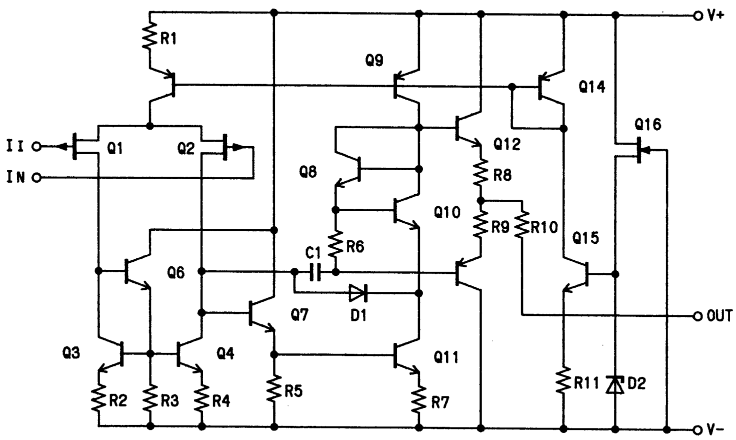


µPC4074

(TOP VIEW)



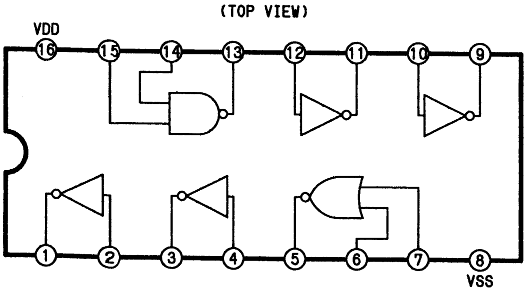
EQUIVALENT CIRCUIT (1/4)



UPC4572

(4 INVERTERS PLUS 2-INPUT NOR GATE PLUS 2-INPUT NAND GATE)

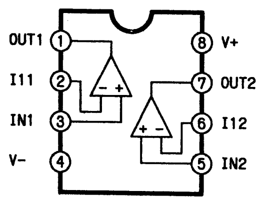
(TOP VIEW)



UPC4558

(OPERATIONAL AMPLIFIER)

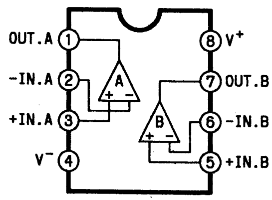
(TOP VIEW)



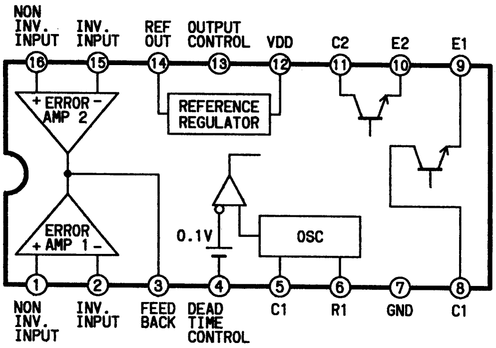
UPC4082

(OPERATIONAL AMPLIFIER)

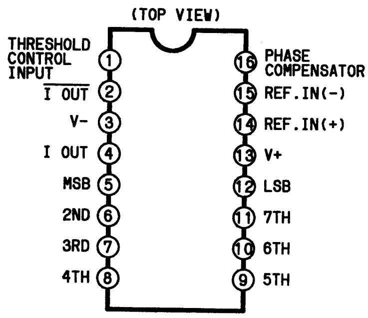
(TOP VIEW)

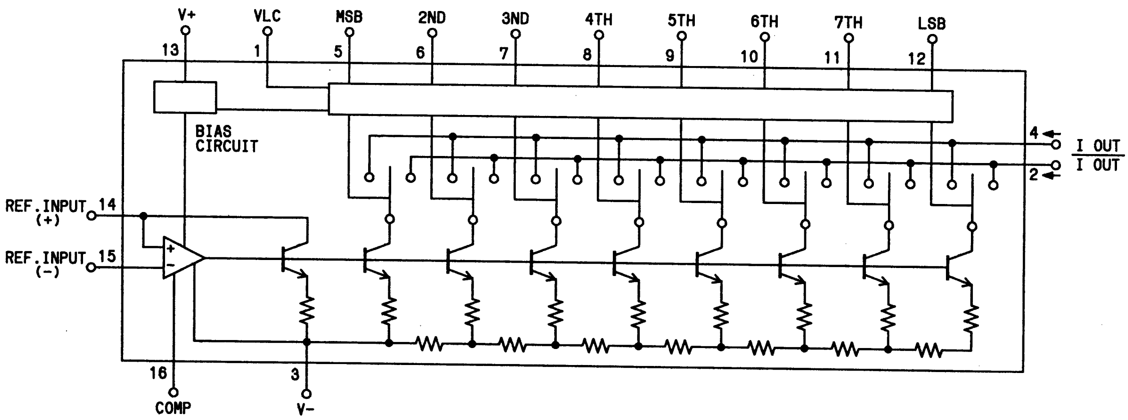


μPC494G
(SWITCHING REGULATOR CONTROL)

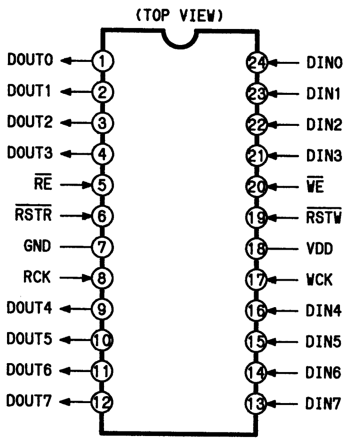


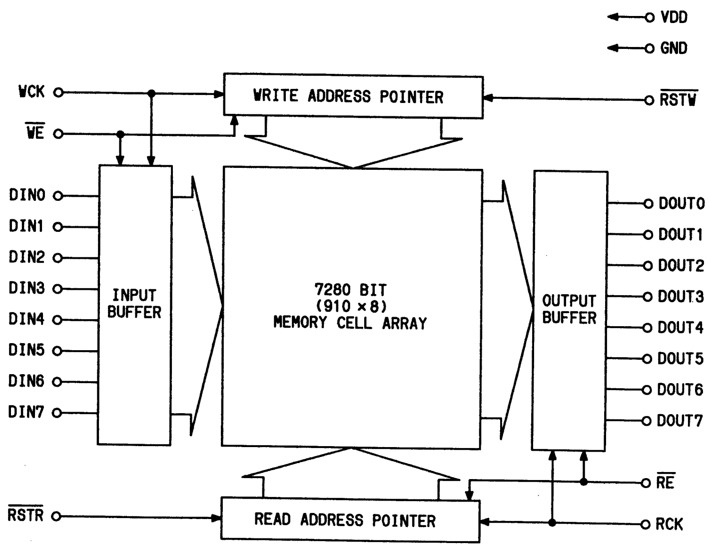
μPC624C
(18-PIN HERMETIC DIP)





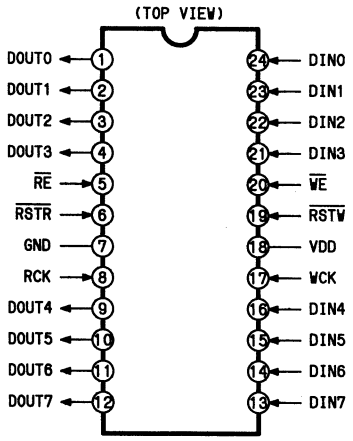
μPD42101G (FIFO 1H DELAY)

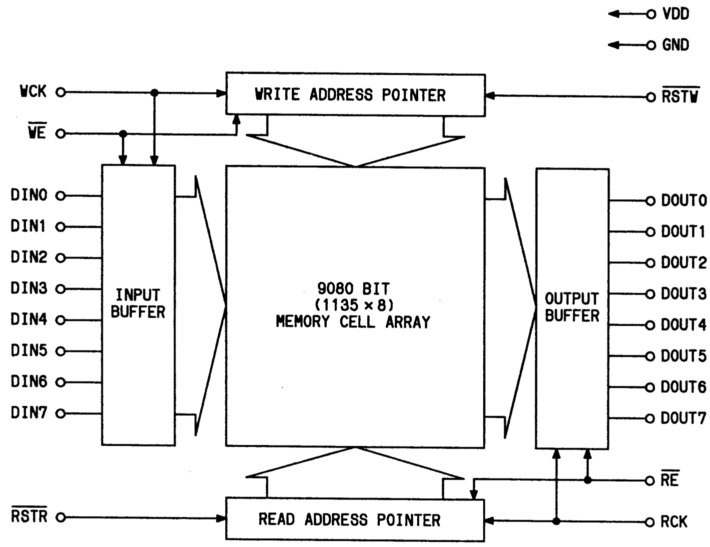




μPD42102G (FIFO 1H DELAY)

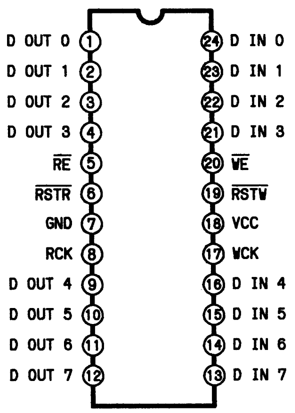
(TOP VIEW)

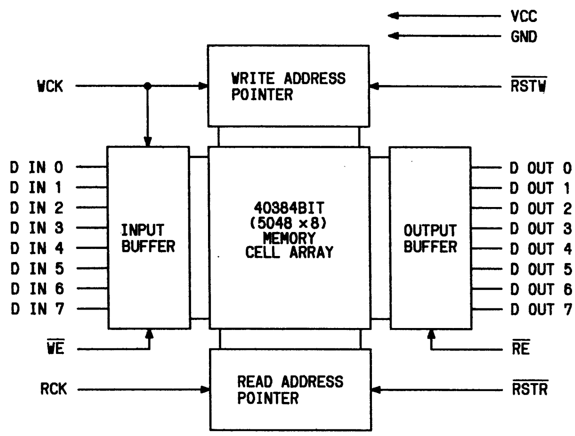




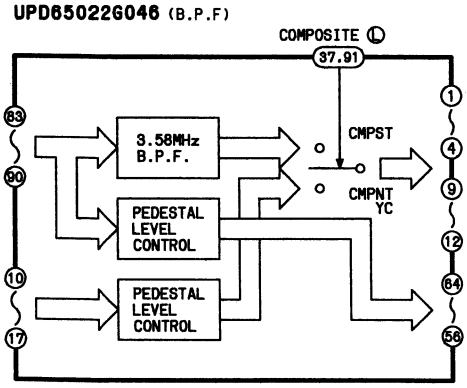
μPD42505C-50
(HIGH SPEED LINE BUFFER)

(TOP VIEW)

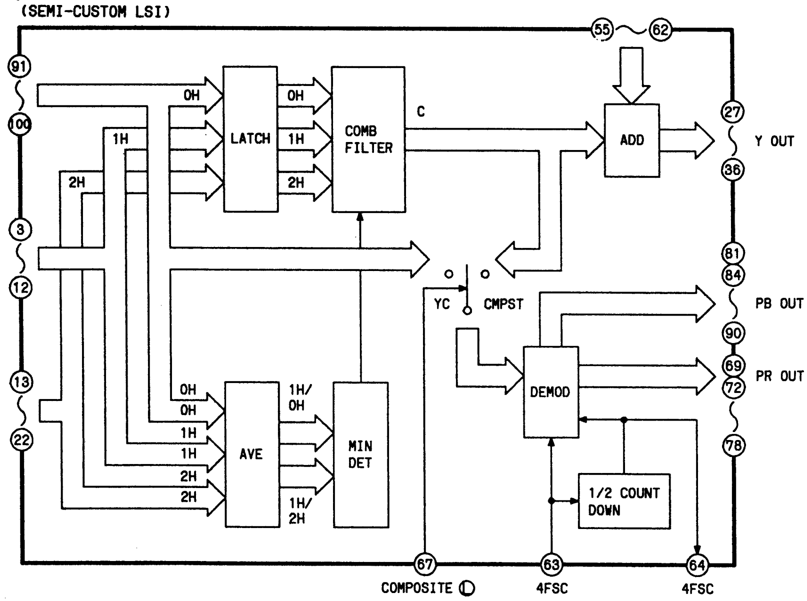




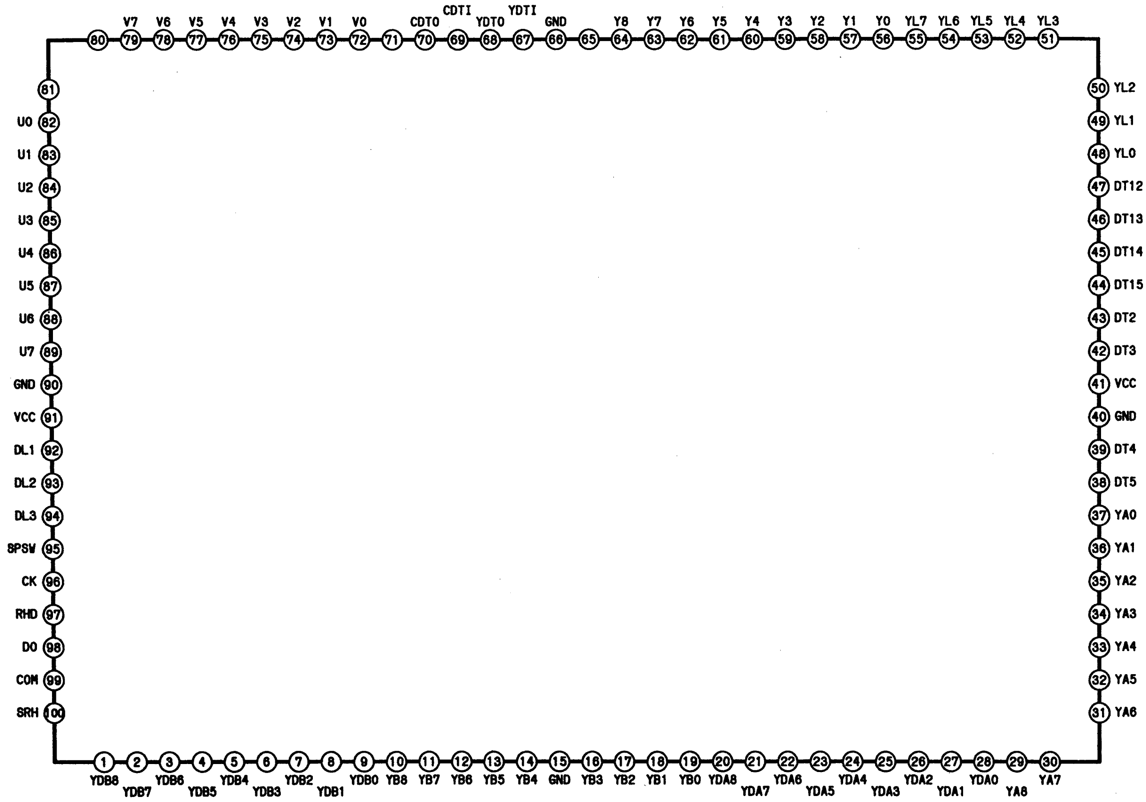
UPD65022G046 (B.P.F)

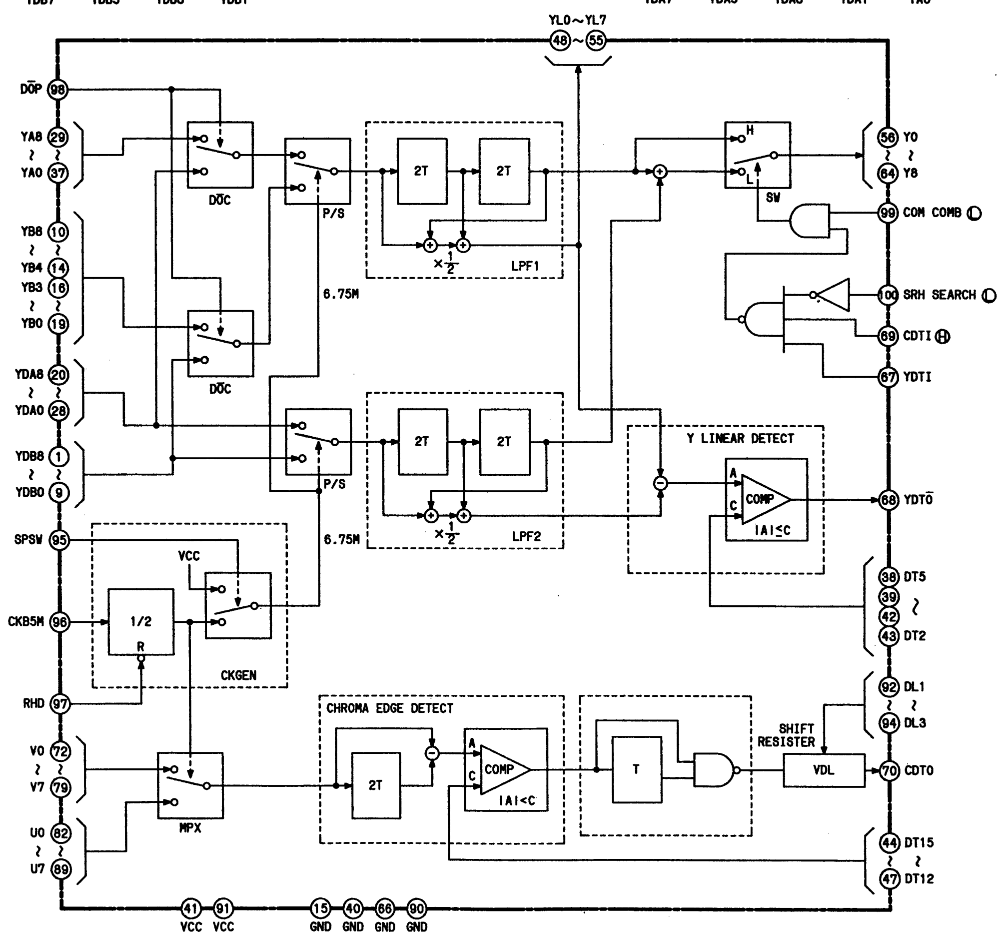


μPD65042G024 (Y/C SEPARATION)
(SEMI-CUSTOM LSI)

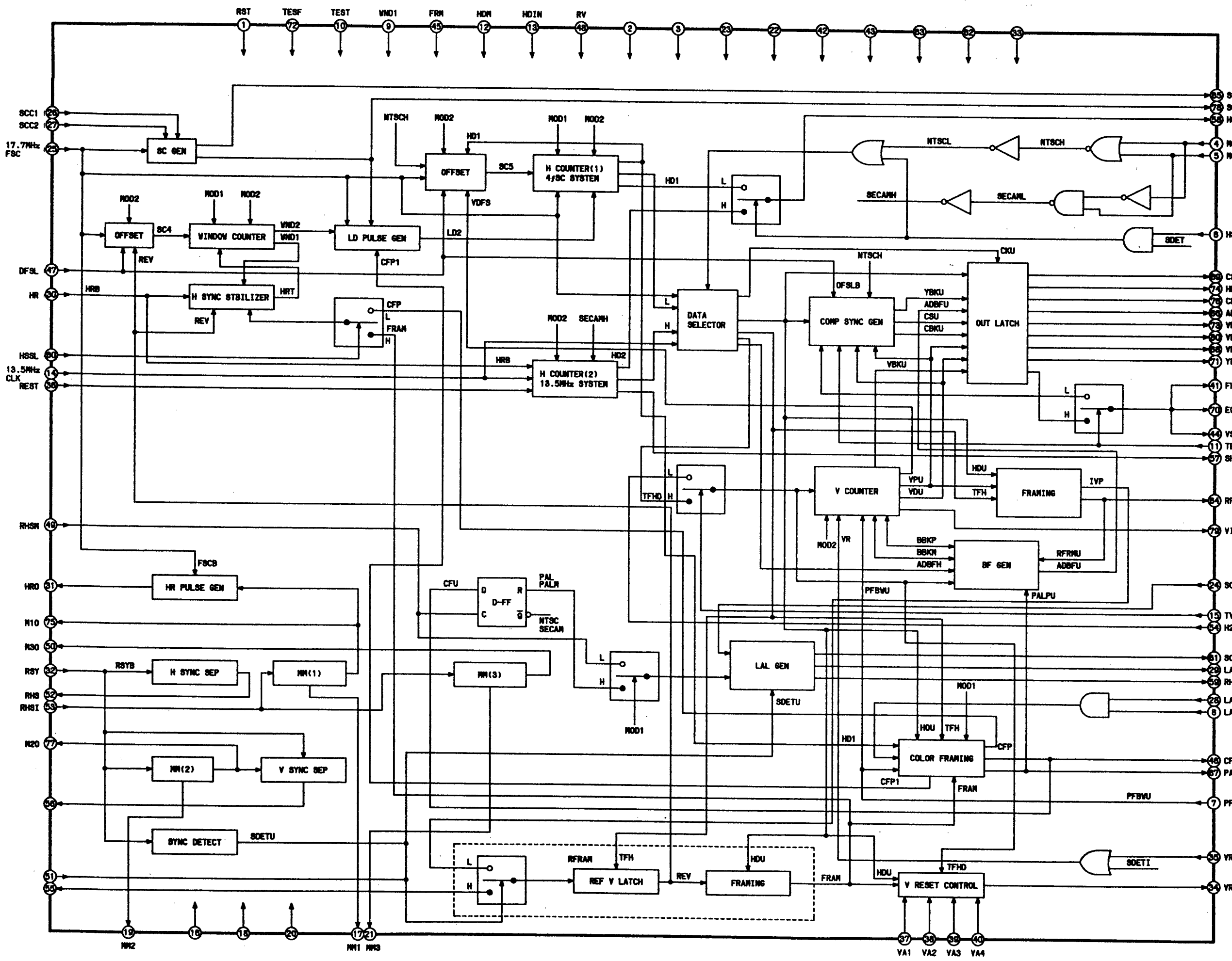


μPD65013F101 (1H/2H DELAY FOR Y/C SEPA)





μPD65022F210 (C-MOS GATE ARRAY)



PIN NO.	SYMBOL	I/O	DESCRIPTIONS	PIN NO.	SYMBOL	I/O	DESCRIPTIONS
1	RST	I	TEST TERMINAL	41	FHS	I/O	H SYNC OUT(fH)
2	VDD	—	VDD 5V	42	VDD	—	VDD 5V
3	GND	—	GND	43	GND	—	GND
4	MOD1	I	TV MODE SELECT(SHOWN IN TABLE1)	44	VSP	I/O	V SERRATION PULSE(2fH)
5	MOD2	I	TV MODE SELECT(SHOWN IN TABLE1)	45	FRM	I	TEST TERMINAL
6	HSEL	I	MAIN CLOCK SELECT(SHOWN IN TABLE2)	46	CF	O	CF SIGNAL OUTPUT
7	PFBW	I	PAL-CF RESET NTSC-V BLANKING WITH SELECT	47	DFSL	I	NTSC-YBK SELECT PAL-OFFSET
8	LAEN	I	LINE ALTERNATE PULSE ENABLE INPUT	48	RV	I	TEST TERMINAL
			HI-INABLE LO-UNINABLE	49	RHSM	I	LUTCH PULSE INPUT(FOR CF DET)
9	VND1	I	TEST TERMINAL	50	M30	O	MM3 OUT
10	TEST	I	TEST TERMINAL	51	SDET	O	REF SYNC (RSY)DETECT
11	TESV	I	TEST TERMINAL	52	RHS	O	REF H SIGNAL
12	HDM1	I	TEST TERMINAL	53	RHSI	I	REF H SYNC INPUT
13	HDIN	I	TEST TERMINAL	54	H2F	I	2fHD INPUT(TVH:LO ONLY)
14	CLK	I	13.5MHz CLOCK INPUT	55	RVS	I	V SYNC INPUT
15	TVH	I	V COUNTER CLOCK SELECT	56	RVSO	O	V SYNC SEPARATOR OUTPUT
			L-H2F EXT H-2fHD INT(or OPEN)	57	SHP	O	SAMPLE HOLD PULSE
16	GND	—	GND(FOR M.M.)	58	HO	O	SIGNAL FOR MAKING TRAPEZOID WAVE(fH)
17	MM1	I/O	CR CONNECTION FOR MM1	59	RH	O	DELAYED "RHSM" PULSE(FOR PAL CF)
18	GND	—	GND(FOR M.M.)	60	HSSL	I	H SYNC STABILITY CIRCUIT SENSITIVITY SELECT
19	MM2	I/O	CR CONNECTION FOR MM2				L(or OPEN)-STABILITY:MAX.RESPONCE:LOW
20	GND	—	GND(FOR M.M.)				H-STABILITY:MIN.RESPONCE:HIGH
21	MM3	I/O	CR CONNECTION FOR MM3	61	SCH	O	CF DET MALFUNCTION PREVENTION PULSE
22	GND	—	GND				HI-NOR.LO-MAL
23	VDD	—	VDD 5V	62	GND	—	GND
24	SCIN	I	SUB CARRIER INPUT	63	VDD	—	VDD 5V
25	FSC	I	4fsc CLOCK INPUT	64	RFRM	O	FRAMING SIGNAL HI-ODD.LO-EVEN
26	SCC1	I	SC1 PHASE CONTROL INPUT	65	SCO	O	SUB CARRIER OUT
27	SCC2	I	SC1 PHASE CONTROL INPUT	66	ADRM	O	ADVANCED BURST FLAG(fH)
28	LALI	I	LINE ALTERNATE PULSE INPUT	67	PALP	O	PAL PALSE OUTPUT(fH/2)
			NTSC-CF RESET PAL-PAL PULSE RESET	68	VBK	O	V BLANKING SIGNAL
29	LALO	I	LINE ALTERNATE PULSE INPUT	69	CS	O	COMPOSITE SYNCHRONIZING SIGNAL
30	HR	I	H COUNTER RESET(4fsc)INPUT	70	EQP	I/O	EQUALIZING PULSE(2fH)
31	HRO	O	H COUNTER RESET(4fsc)OUTPUT	71	YBK	O	B/W CONTROL PULSE
32	RSY	I	REFERENCE SYNC INPUT	72	TESF	I	TEST TERMINAL
33	GND	—	GND	73	VP	O	VP PULSE
34	VRO	O	V COUNTER RESET OUTPUT	74	HD	O	HD PULSE(2fH)
35	VRI	I	V COUNTER RESET INPUT	75	M10	O	MM1 OUT
36	REST	I	H COUNTER RESET(13.5MHz)	76	CBK	O	COMPOSITE SYNCHRONIZING SIGNAL
37	VA1	I	V RESET OUTPUT PHASE SELECT	77	M20	O	MM2 OUT
38	VA2	I	V RESET OUTPUT PHASE SELECT	78	SC1	O	SUB CARRIER OUT
39	VA3	I	V RESET OUTPUT PHASE SELECT	79	VISC	O	VISC GATE PULSE
40	VA4	I	V RESET OUTPUT PHASE SELECT	80	VD	O	VD PULSE

MOD1	MOD2	TV SYSTEM
0	0	NTSC
0	1	SECAM
1	0	PALM
1	1	PAL

"0" ··· GND
"1" ··· VDD

TABLE1

MODE	SDET	HSEL	CLOCK SIGNAL
NTSC	0	X	SYNC ··· FSC HO ··· FSC
	1	0	
	1	1	SYNC ··· FSC HO ··· HR
PAL	0	X	SYNC ··· CLK HO ··· FSC
	1	0	
	1	1	SYNC ··· CLK HO ··· HR

"X" IS DON'T CARE
HO ··· HO RISING POSITION

TABLE2

VA4	VA3	VA2	VA1	V PHASE
0	0	0	0	0H
0	0	0	1	+1H
0	0	1	0	+2H
0	0	1	1	+3H
0	1	0	0	+4H
0	1	0	1	+5H
0	1	1	0	+6H
0	1	1	1	+8H
1	0	0	0	+10H
1	0	0	1	+12H
1	0	1	0	+14H
1	0	1	1	+16H
1	1	0	0	-4H
1	1	0	1	-3H
1	1	1	0	-2H
1	1	1	1	-1H

{ VRO AND VRI ··· CONNECTION
V PHASE REF ··· RSY }
"+" ··· ADV "-" ··· DELAY

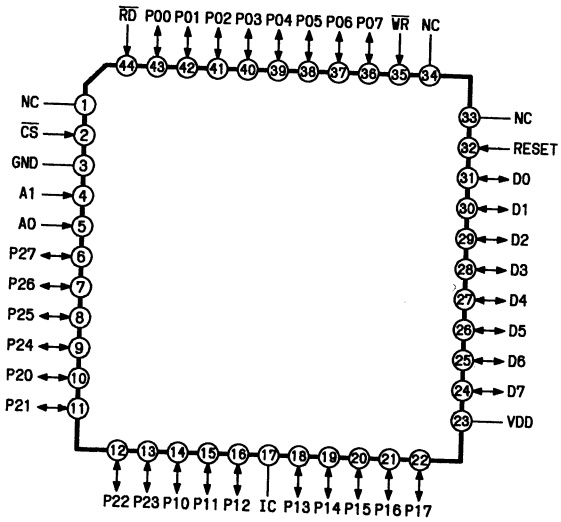
TABLE3

μPD65061GF032 (MEMORY CONTROL)

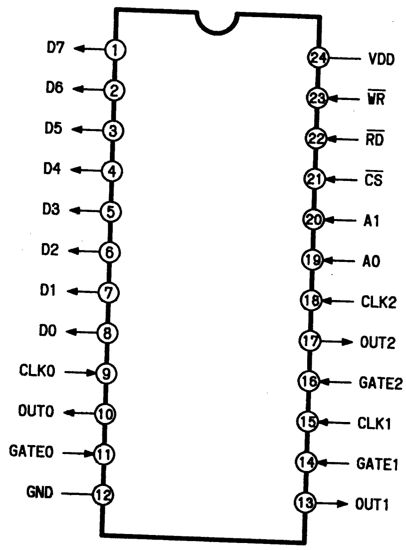
(TOP VIEW)

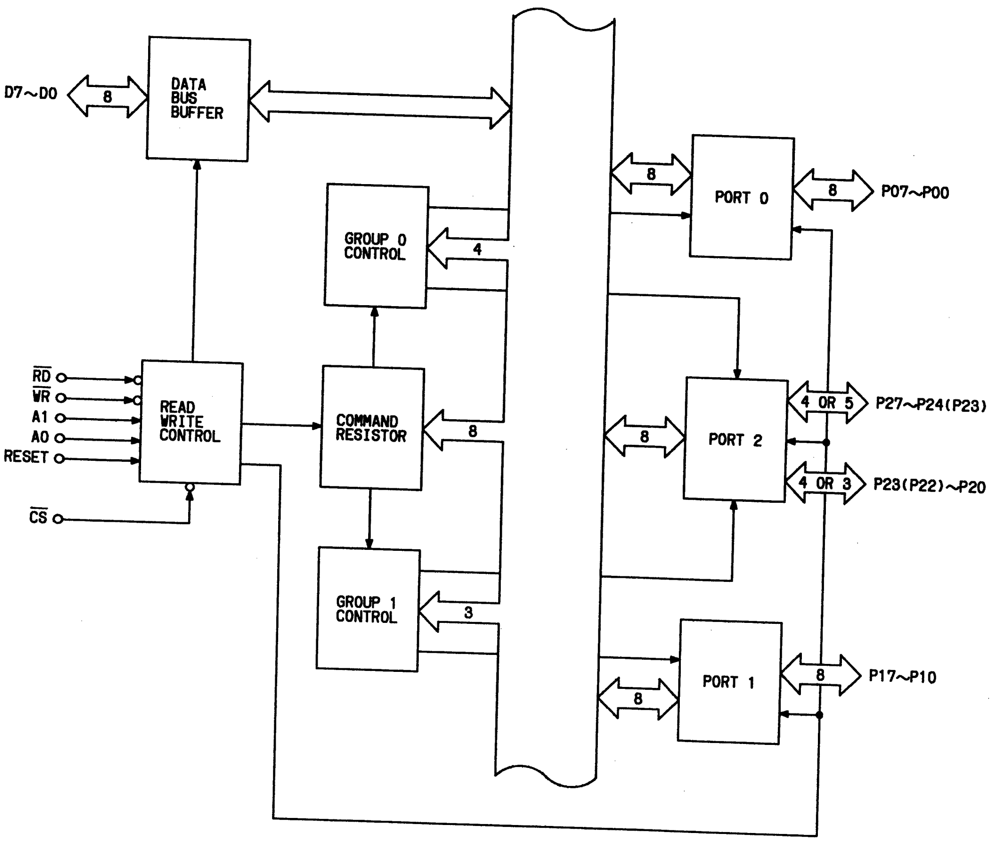
PIN NO.	PIN NAME	PIN NO.	PIN NAME	PIN NO.	PIN NAME	PIN NO.	PIN NAME
1	GND	26	COUN	51	M1WN	76	A116
2	VDD	27	A00	52	VDD	77	N.C.
3	PAL	28	GND	53	GND	78	TEST
4	LINR	29	VDD	54	A10	79	VDD
5	A016	30	MOWN	55	C1UN	80	GND
6	A015	31	FSC2	56	C1LN	81	M1RN
7	A014	32	$\overline{O}$STN	57	A11	82	ADLD
8	A012	33	FSTN	58	A110	83	$\overline{O}$CPA
9	WEON	34	DL$\overline{O}$	59	A12	84	SEG0
10	A07	35	DLI	60	$\overline{O}$E1N	85	SEG1
11	A013	36	EX0	61	GND	86	FLD0
12	GND	37	EX1	62	A13	87	FLD1
13	A06	38	EX2	63	A111	88	FLD2
14	A08	39	EX3	64	A14	89	CSI0
15	A05	40	GND	65	A19	90	CSI1
16	A09	41	EX4	66	A15	91	CSI2
17	A04	42	EX5	67	A18	92	CSI3
18	A011	43	EX6	68	A16	93	CS$\overline{O}$0
19	A03	44	EX7	69	GND	94	CS$\overline{O}$1
20	GND	45	EX8	70	A113	95	CS$\overline{O}$2
21	$\overline{O}$EON	46	EX9	71	A17	96	CS$\overline{O}$3
22	A02	47	EX10	72	WE1N	97	CHON
23	A010	48	EX11	73	A112	98	INTN
24	A01	49	EX12	74	A114	99	WCLK
25	COLN	50	EX13	75	A115	100	MORN

UPD71055G
(PARALLEL INTERFACE UNIT)



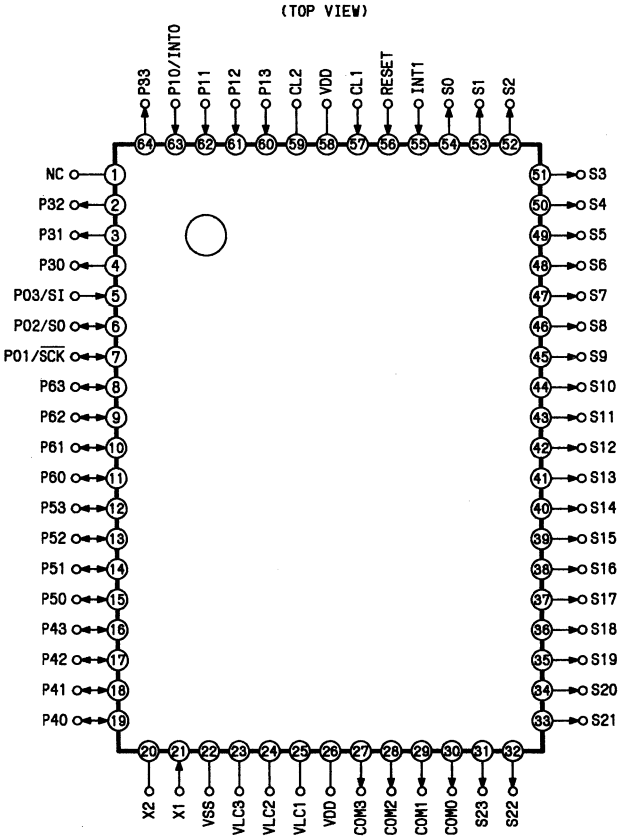
UPD71054G
(PROGRAMMABLE TIMER COUNTER)





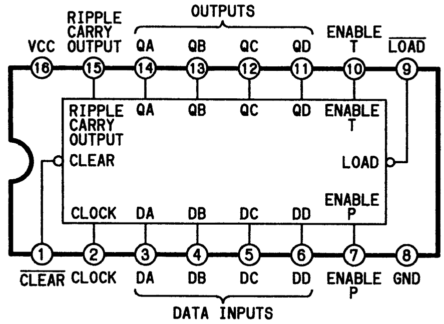
UPD7503G
(4-BIT MICRO COMPUTER)

(TOP VIEW)



74163
(SYNCHRONOUS PRESETTABLE BINARY COUNTER WITH CLEAR)

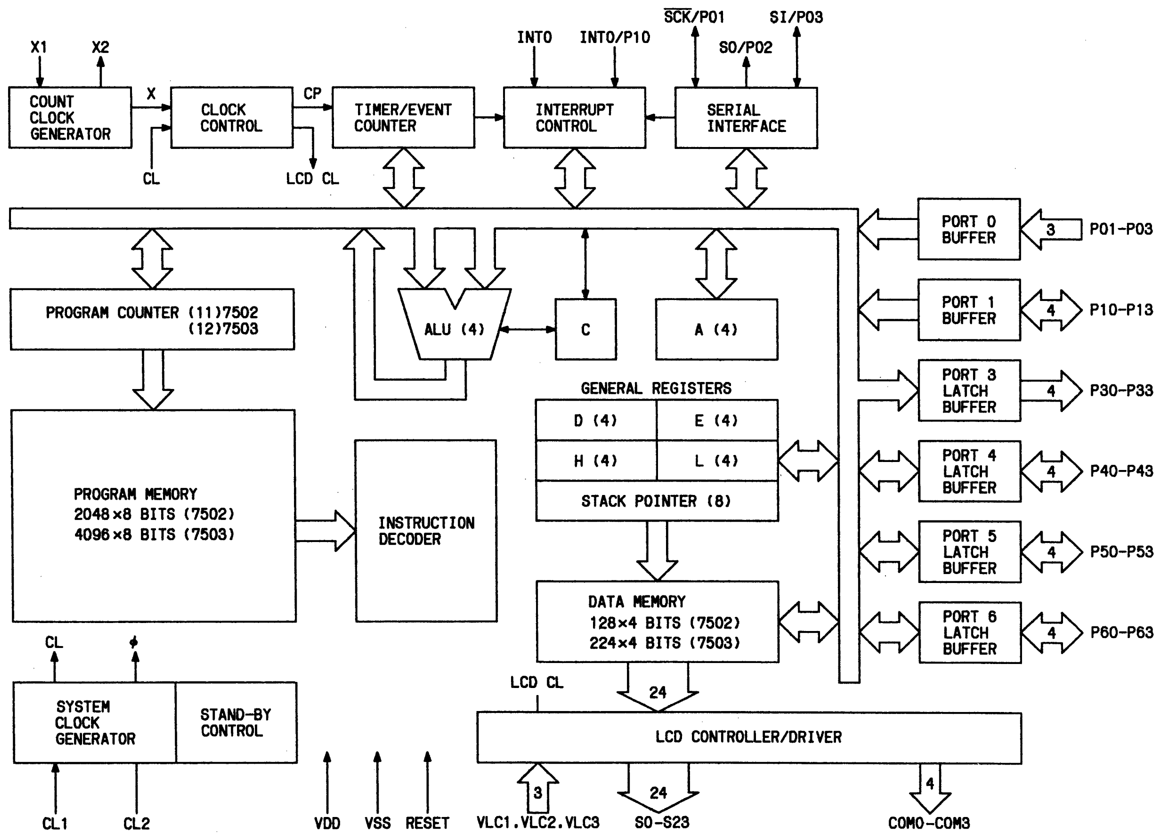
(TOP VIEW)



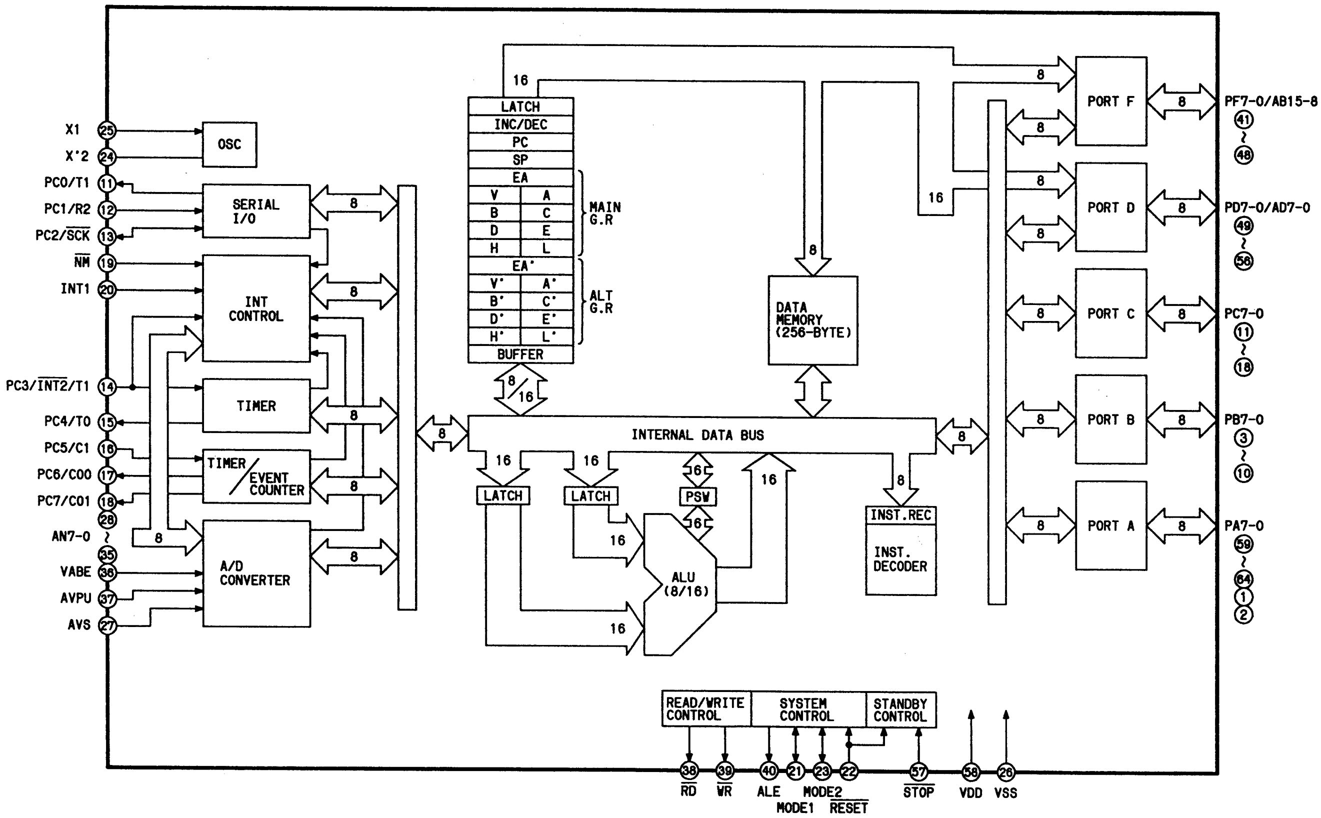
FUNCTION TABLE

INPUT					OUTPUT		FUNCTION
CLEAR	LOAD	CK	ENABLE P	ENABLE T	QA QB QC QD	RIPPLE CARRY	
H	H		H	H	———	—	COUNT
H	L	↑	X	X	DA DB DC DD	—	DATA SET
L	X		X	X	L L L L	—	CLEAR
X	X	X	X	H	H H H H	H	—

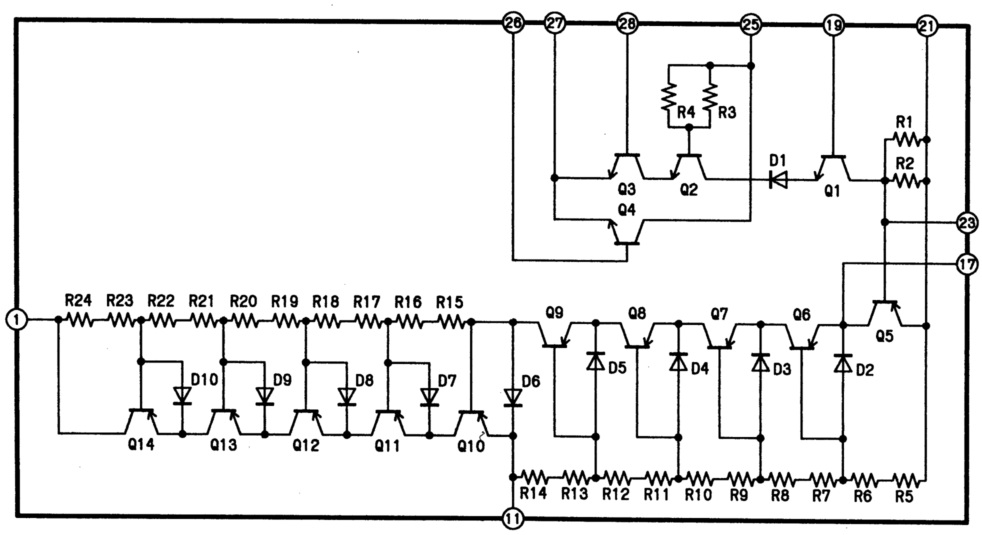
H:HIGH L:LOW X:H or L
n:A~D



UPD78C10G
(8-BIT MICRO COMPUTER)

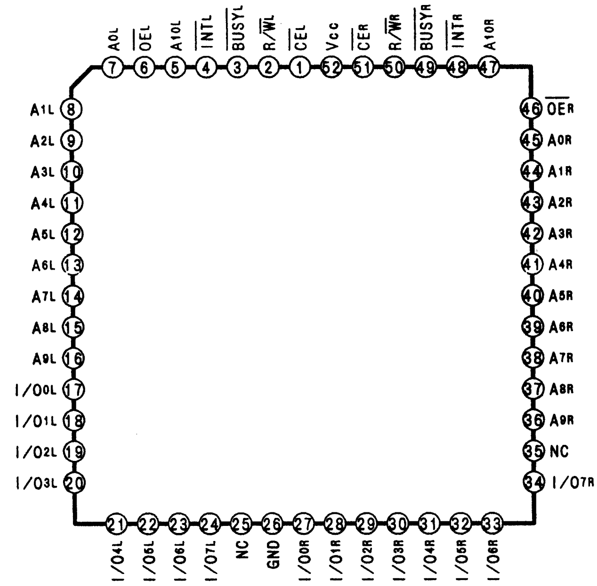


VCR0111
(DRIVE AMPLIFIER)

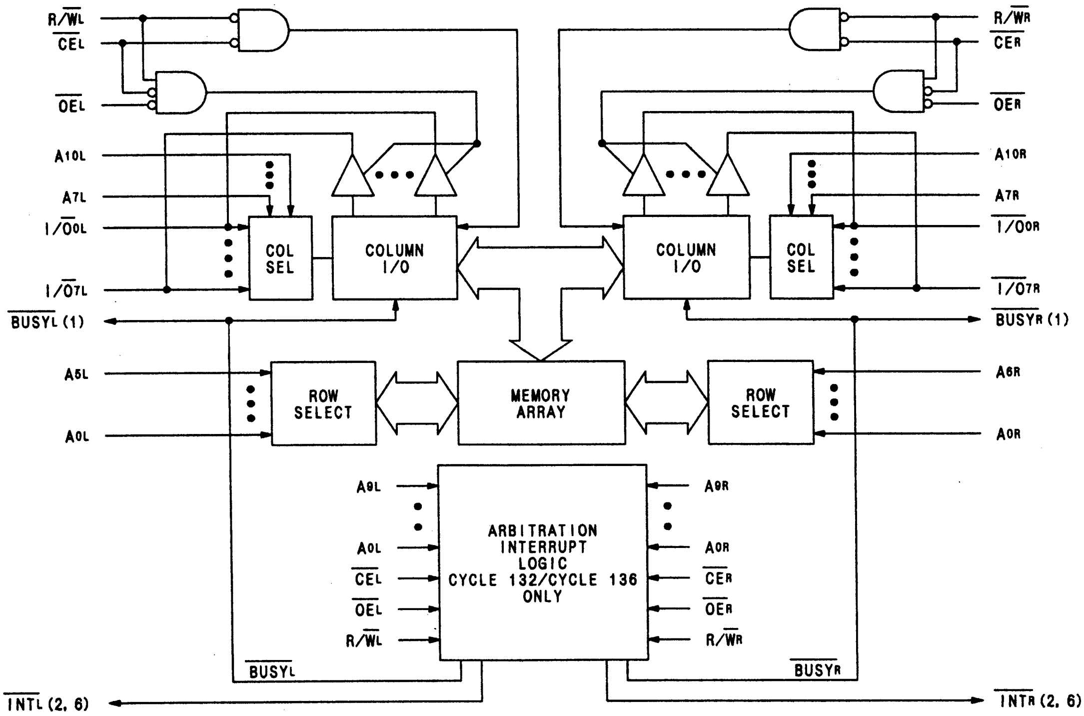


CY7C136-35
(MEMORY IC)

(TOP VIEW)

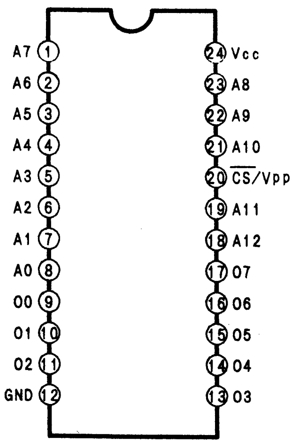


(BLOCK DIAGRAM)

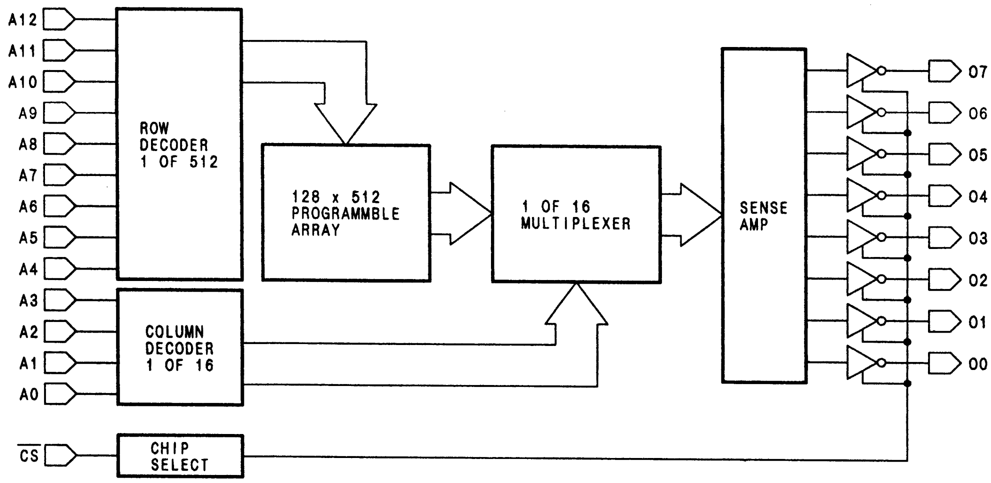


AK27CX642
27CX642
(C MOS EPROM)

(TOP VIEW)

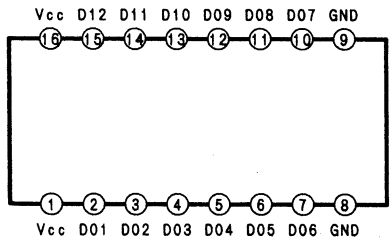


(BLOCK DIAGRAM)

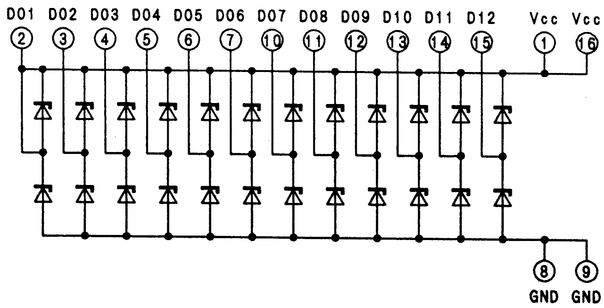


SN74S1051NS
(DIODE ARRAY)

(TOP VIEW)

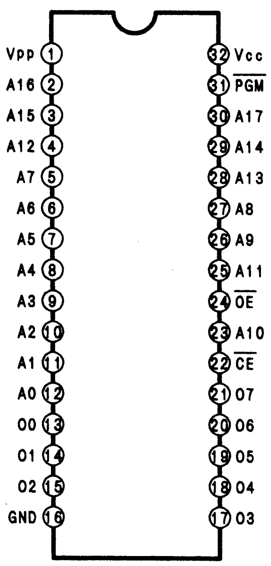


(BLOCK DIAGRAM)

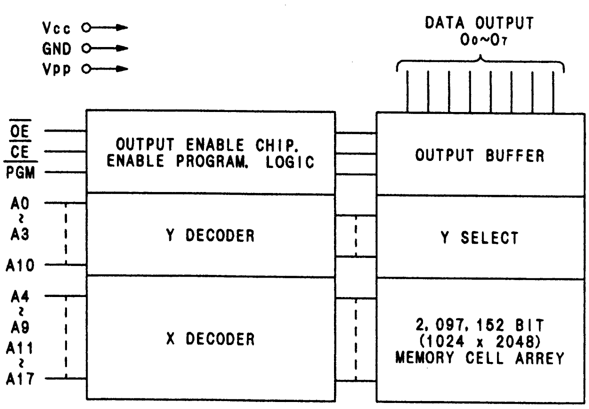


µPD27C2001
(MEMORY IC)

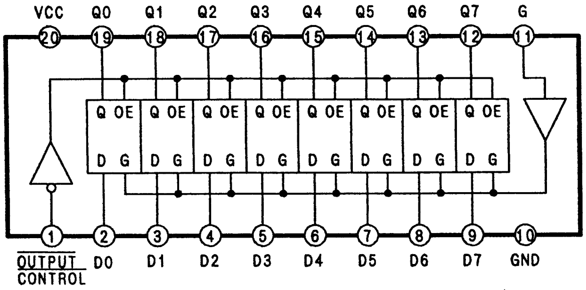
(TOP VIEW)



(BLOCK DIAGRAM)

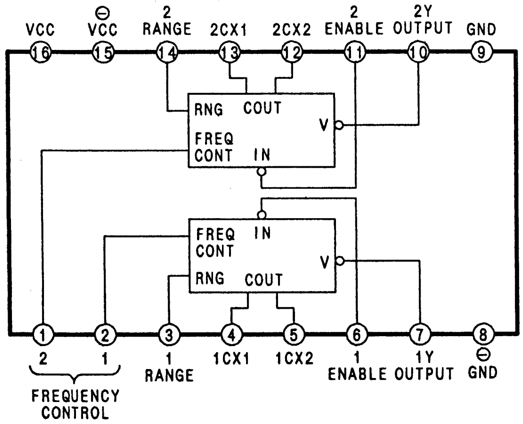


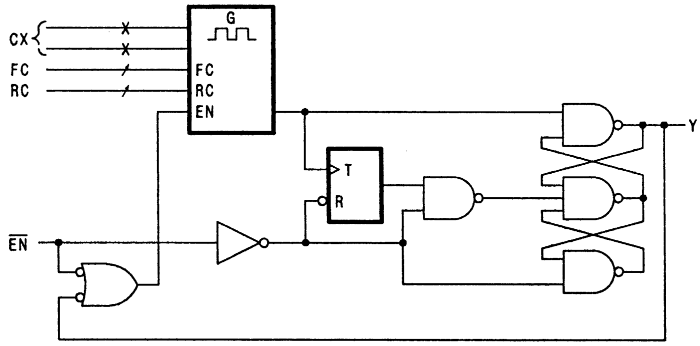
74573
(OCTAL 3 STATE D-LATCHES)



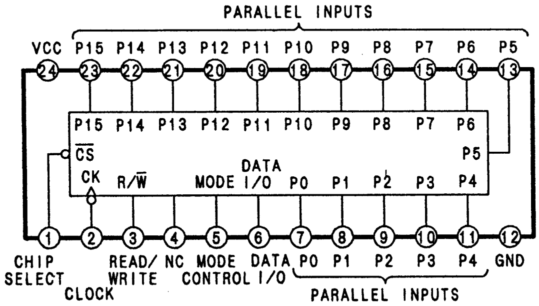
INPUT		FUNCTION
OUTPUT CONTROL	LATCH ENABLE	
L	L	LATCH (HOLD)
L	H	Q=D
H	X	HIGH-Z

74629
(DUAL VCO)



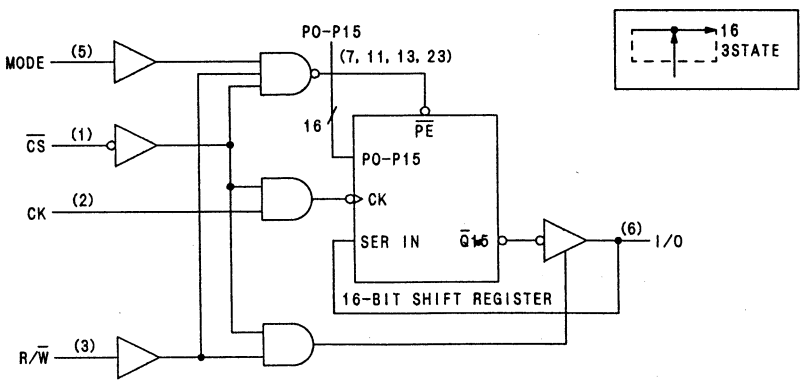


74674
(16 BIT SHIFT REGISTER)

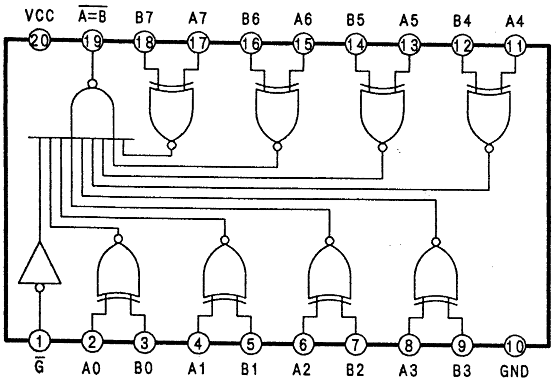


FUNCTION TABLE

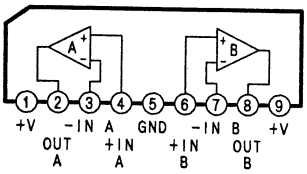
INPUTS				I/O	OPERATION
$\overline{CS}$	R/$\overline{W}$	MODE	CLOCK	PORT	
H	X	X	X	Z	DO NOTHING
L	L	X	↓	Z	SHIFT AND WRITE (SERIAL LOAD)
L	H	L	↓	Q14N	SHIFT AND READ
L	H	H	↓	P15	PARALLEL LOAD

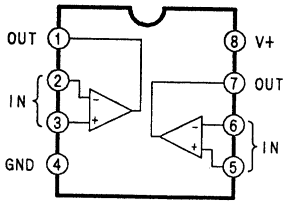


74688
(8 BIT EQUAL-TO COMPARATOR)



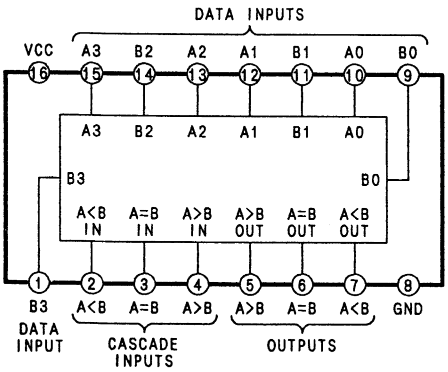
AN6558/S
(LOW NOISE , HIGH SPEED AMP)





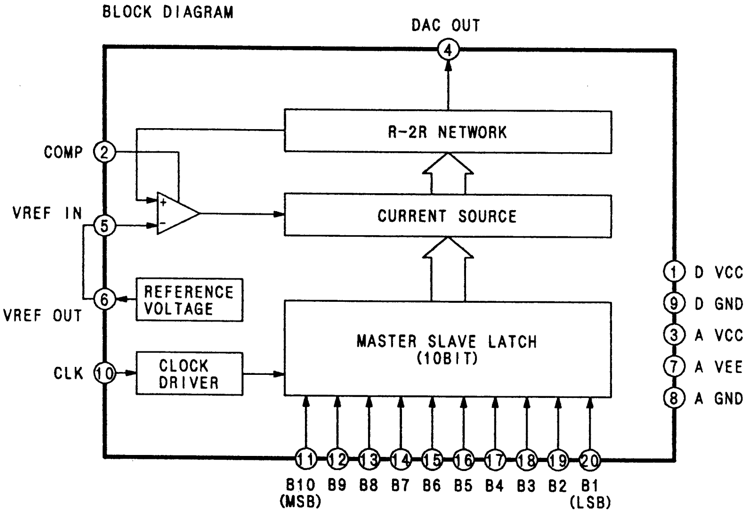
(TOP VIEW)

7485
(4 BIT MAGNITUDE COMPARATOR)



HA19505
(VIDEO 10 BIT D/A CONVERTER)

BLOCK DIAGRAM

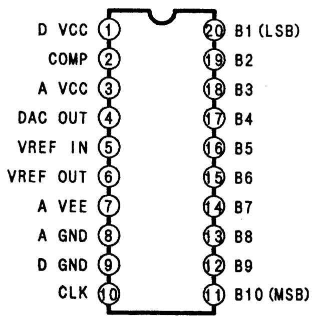


FUNCTION TABLES

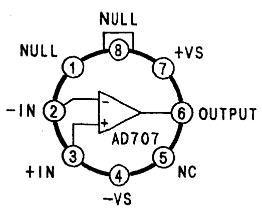
COMPARING INPUTS				CASCADING INPUTS			OUTPUTS		
A3, B3	A2, B2	A1, B1	A0, B0	A>B	A<B	A=B	A>B	A<B	A=B
A3>B3	X	X	X	X	X	X	H	L	L
A3<B3	X	X	X	X	X	X	L	H	L
A3=B3	A2>B2	X	X	X	X	X	H	L	L
A3=B3	A2<B2	X	X	X	X	X	L	H	L
A3=B3	A2=B2	A1>B1	X	X	X	X	H	L	L
A3=B3	A2=B2	A1<B1	X	X	X	X	L	H	L
A3=B3	A2=B2	A1=B1	A0>B0	X	X	X	H	L	L
A3=B3	A2=B2	A1=B1	A0<B0	X	X	X	L	H	L
A3=B3	A2=B2	A1=B1	A0=B0	H	L	L	H	L	L
A3=B3	A2=B2	A1=B1	A0=B0	L	H	L	L	H	L

A3=B3	A2=B2	A1=B1	A0=B0	X	X	H	L	L	H
A3=B3	A2=B2	A1=B1	A0=B0	H	H	L	L	L	L
A3=B3	A2=B2	A1=B1	A0=B0	L	L	L	H	H	L

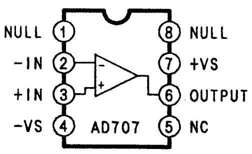
(TOP VIEW)



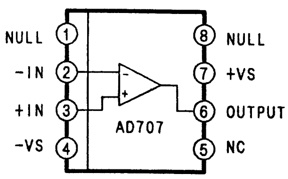
AD707KR
(SUPPER LOW DRIFT)



NC=NO CONNECT



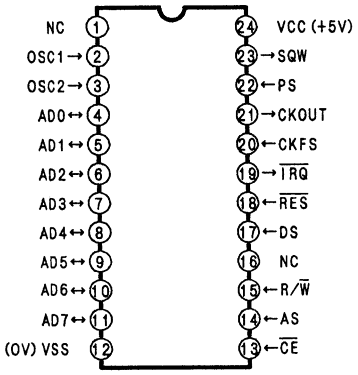
NC=NO CONNECT



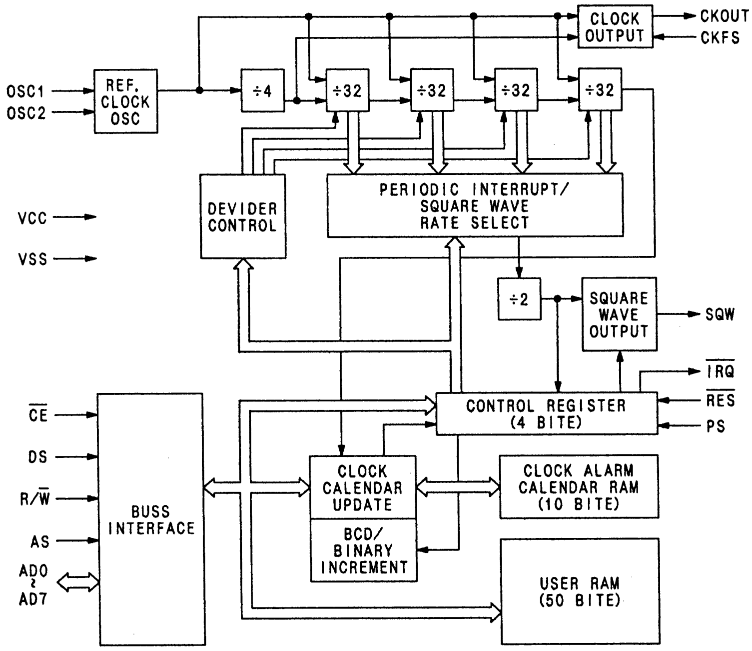
NC=NO CONNECT

HD146818
(REAL TIME CLOCK PLUS RAM)

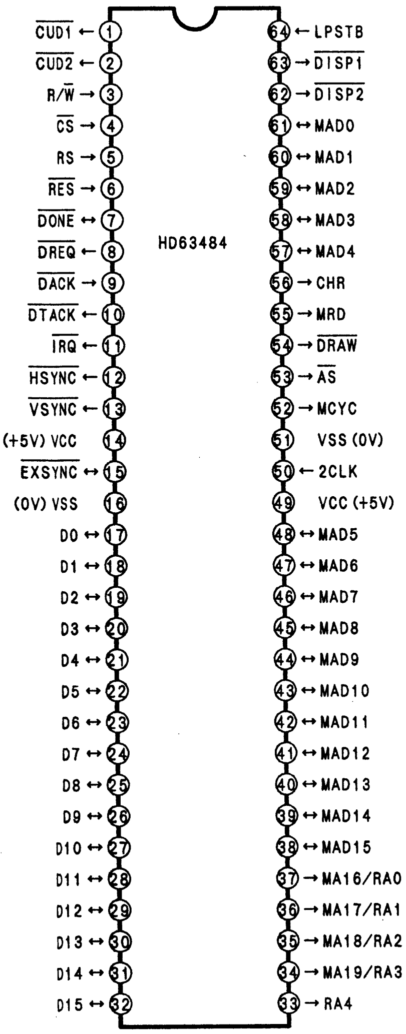
(TOP VIEW)

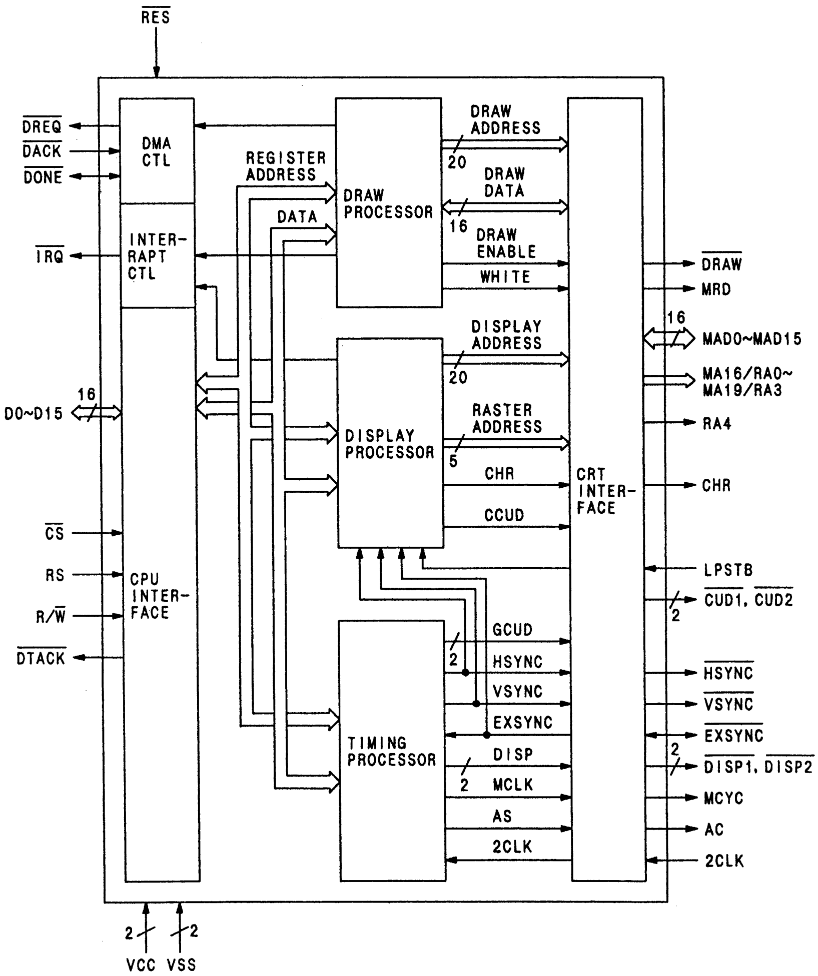


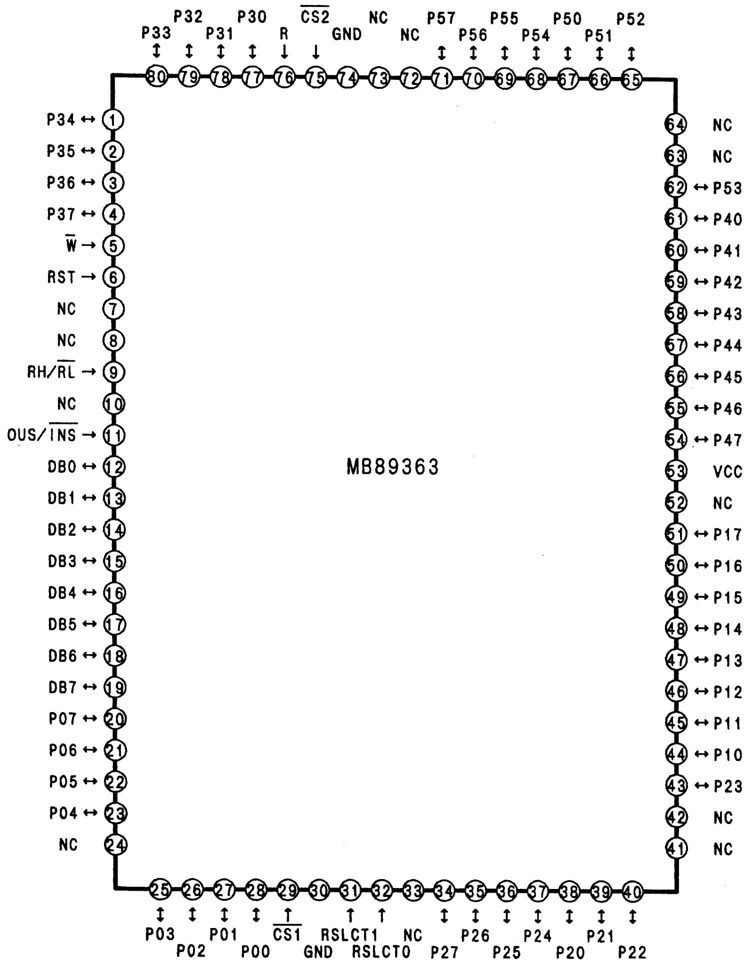
BLOCK DIAGRAM



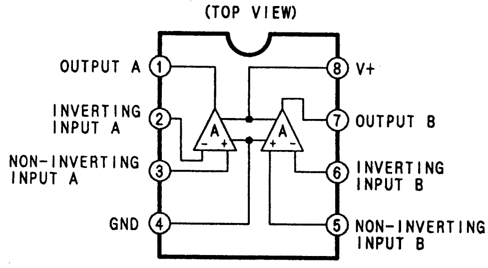
HD63484
(ADVANCED CRT CONTROLLER)





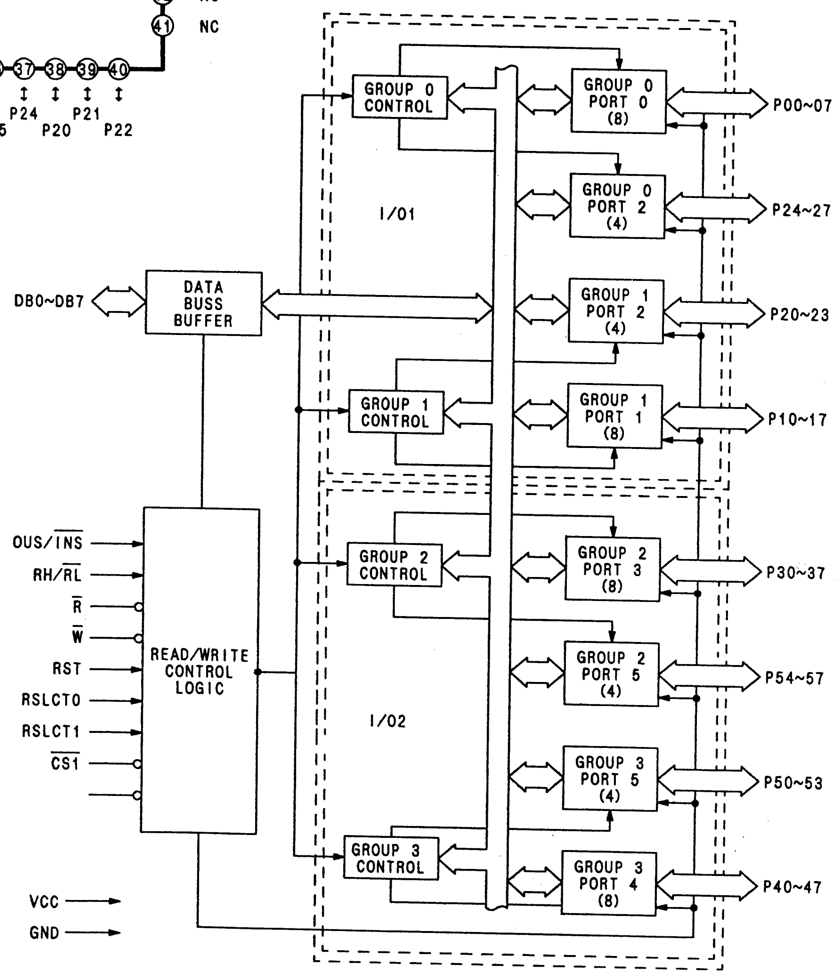


LM2903M
(VOLTAGE COMPARATOR (DUAL))

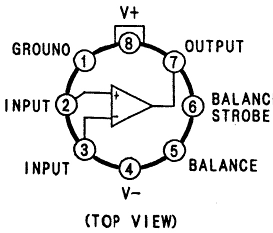


MB89363
(PROGRAMMABLE PERIPHERAL INTERFACE)
(TOP VIEW)

BLOCK DIAGRAM

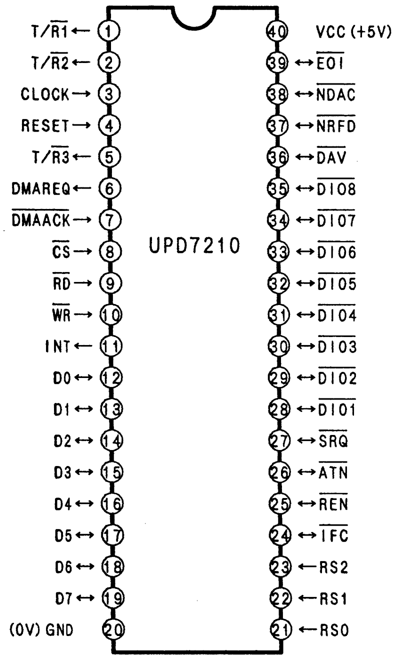


LM311M
(VOLTAGE COMPARATOR)



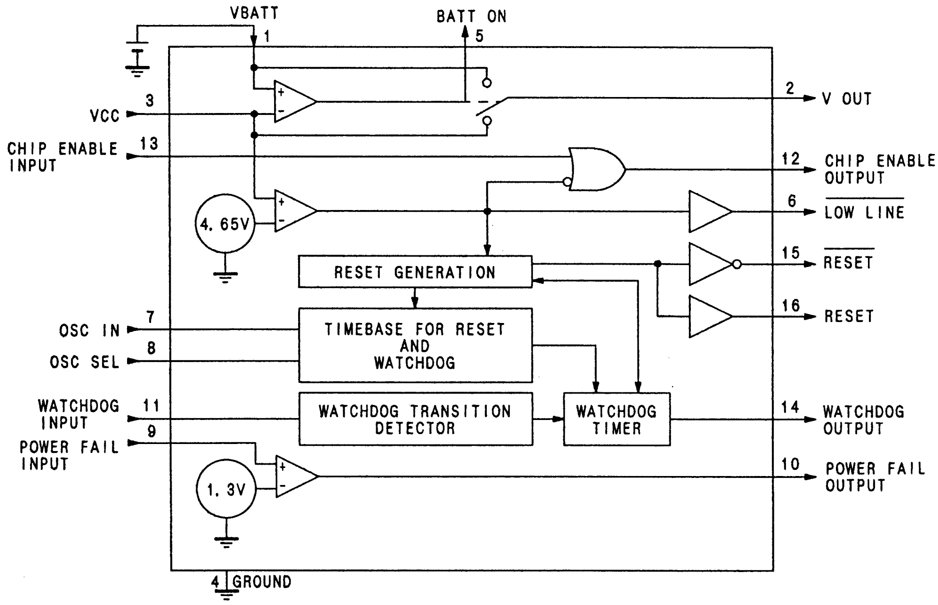
UPD7210
(GPIB INTERFACE CONTROLLER)

(TOP VIEW)

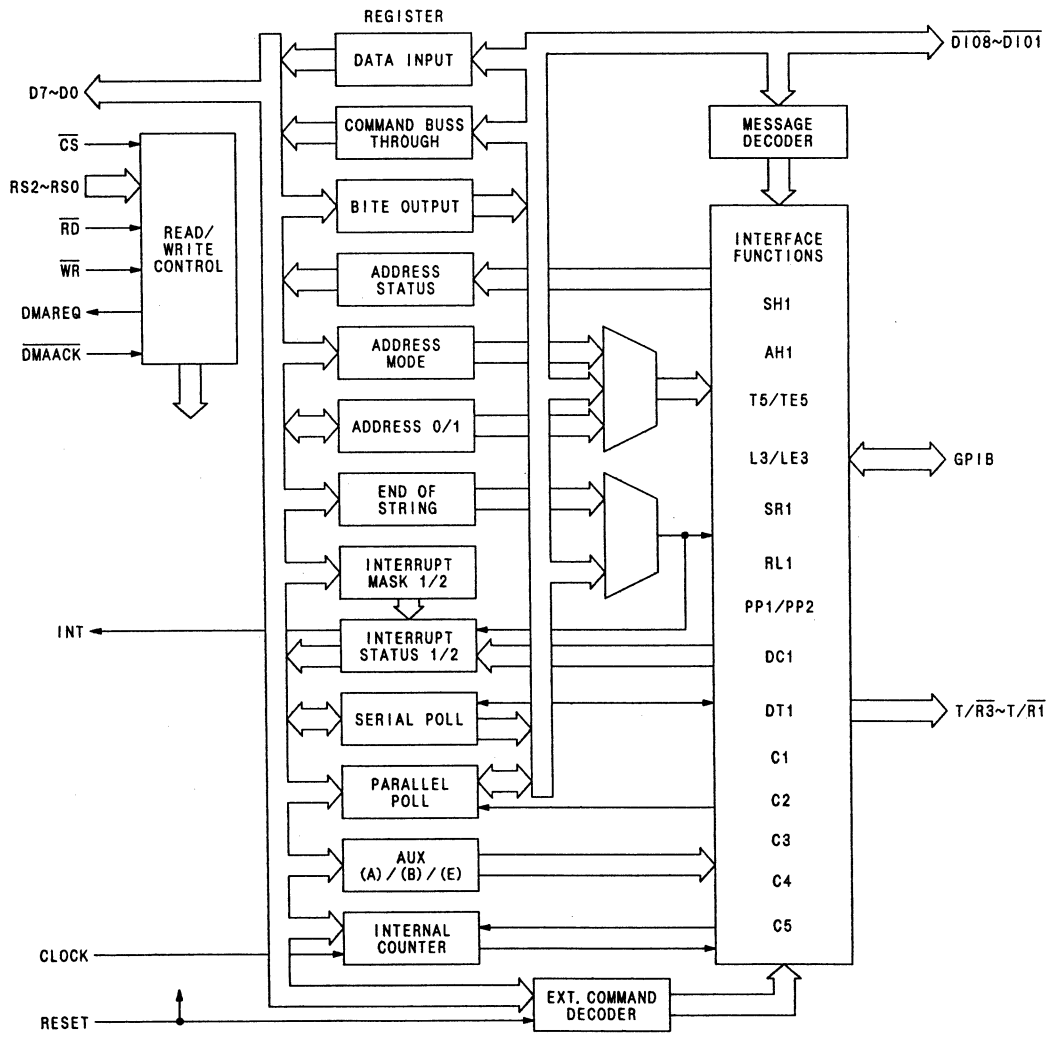


MAX690
(POWER WATCHDOG & CONTROL)

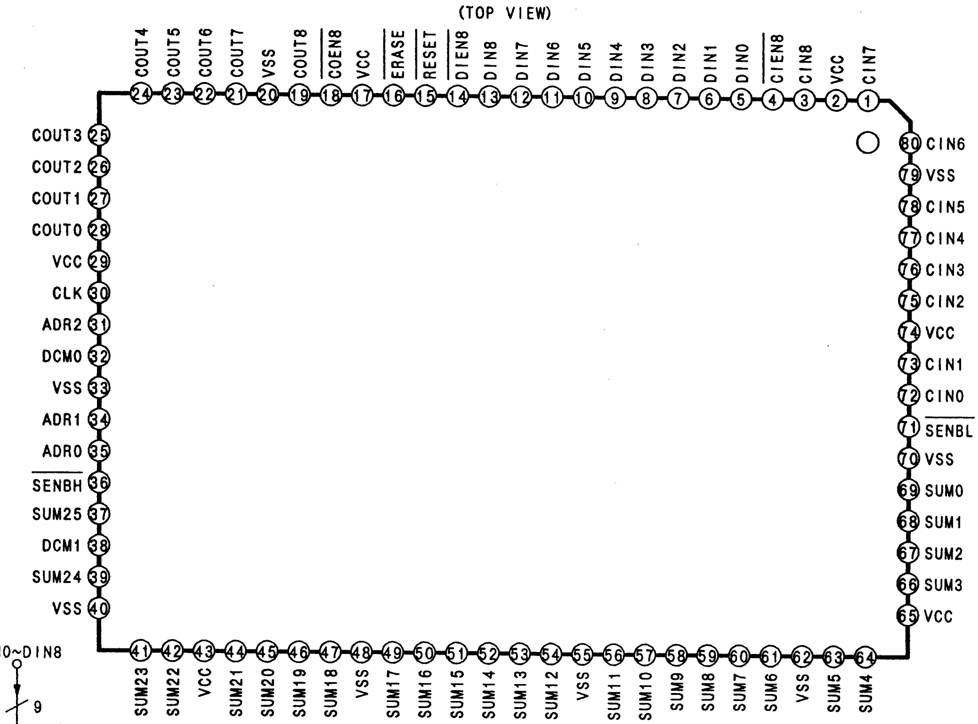
BLOCK DIAGRAM



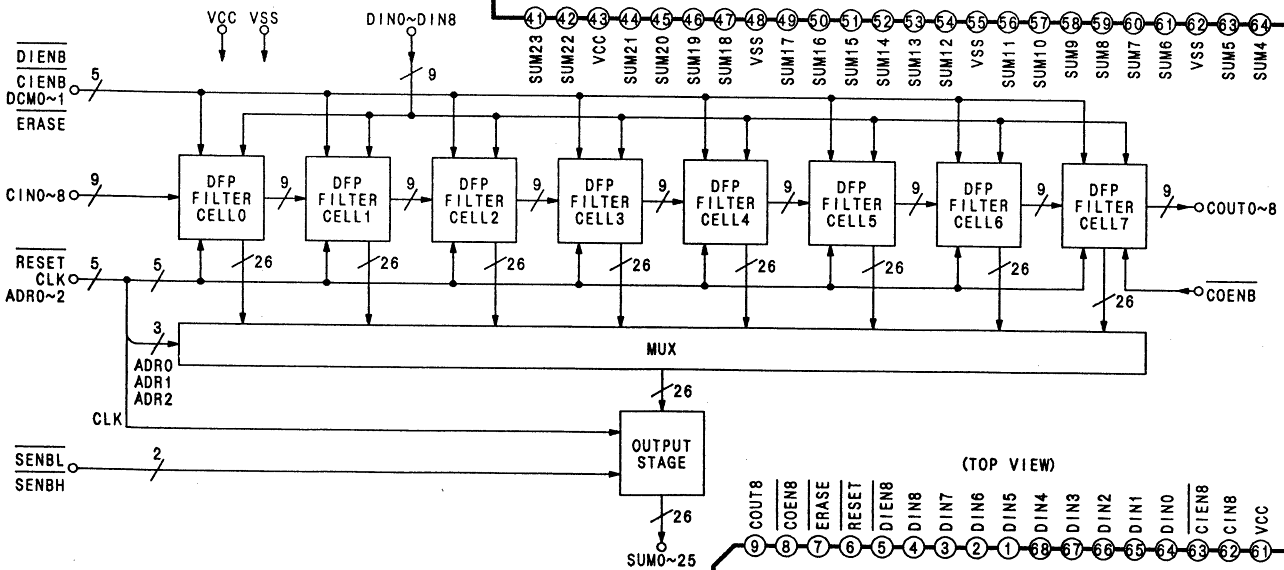
BLOCK DIAGRAM

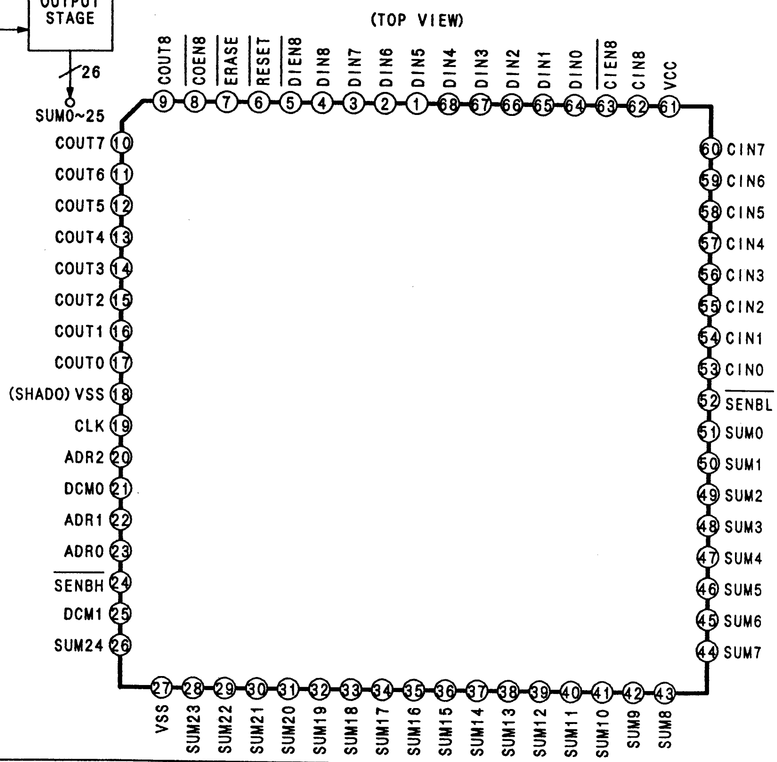


ZR33891
(DIGITAL FILTER PROCESSOR)

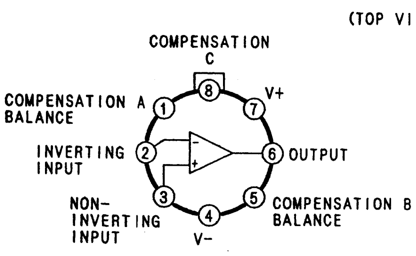


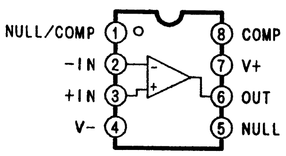
BLOCK DIAGRAM





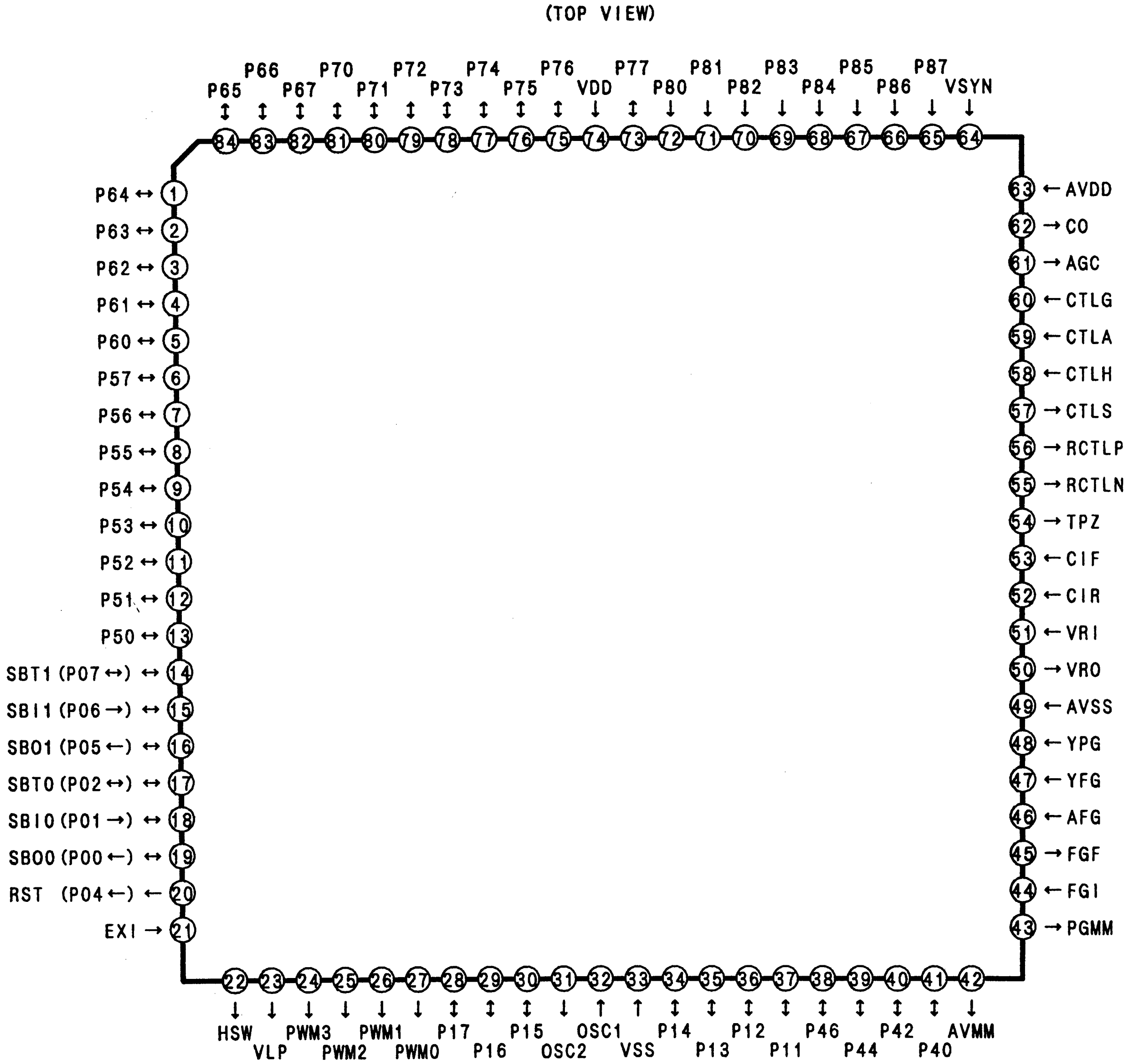
LM318N





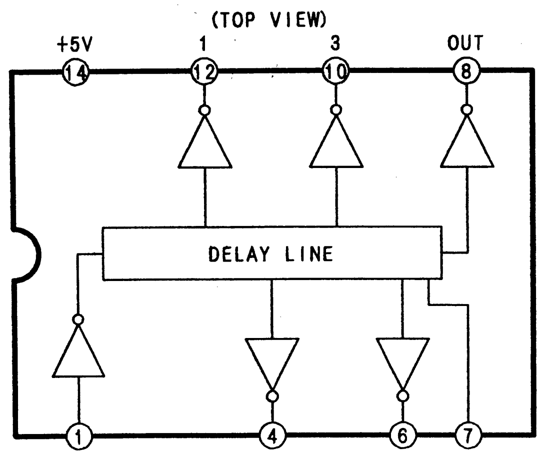
MN67512

(MICROPROCESSOR FOR VTR SERVO)

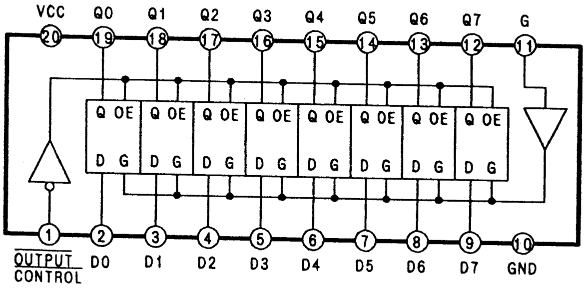


ADM50ND

(DELAY IC)

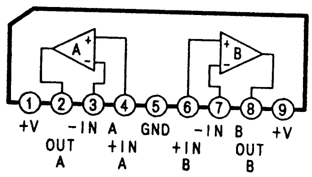


74573
(OCTAL 3 STATE D-LATCHES)

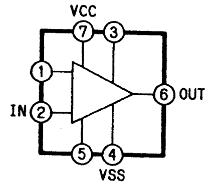


INPUT		FUNCTION
OUTPUT CONTROL	LATCH ENABLE	
L	L	LATCH (HOLD)
L	H	Q=D
H	X	HIGH-Z

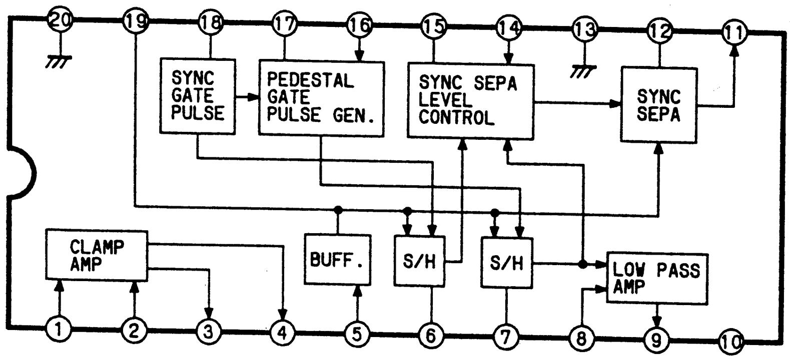
AN6558/S
(LOW NOISE , HIGH SPEED AMP)



BA301

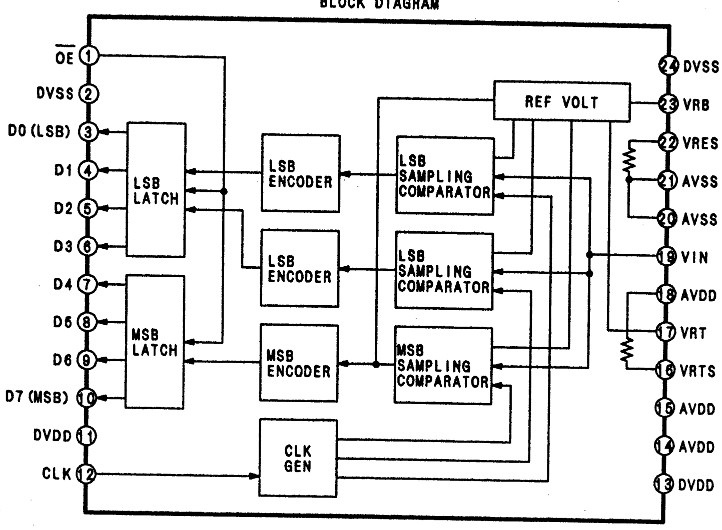


AN91A12S
(SYNC SEPARATOR)

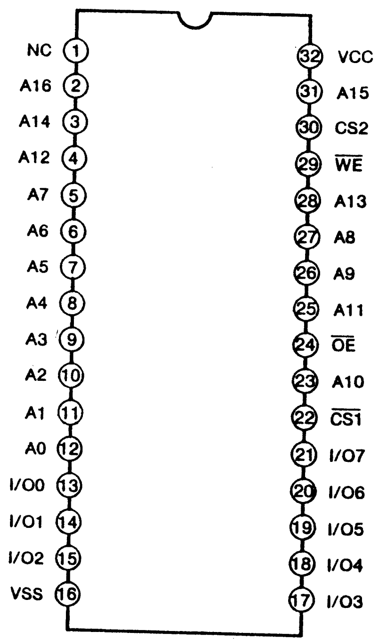


CXD1175M
(8 bit VIDEO A/D)

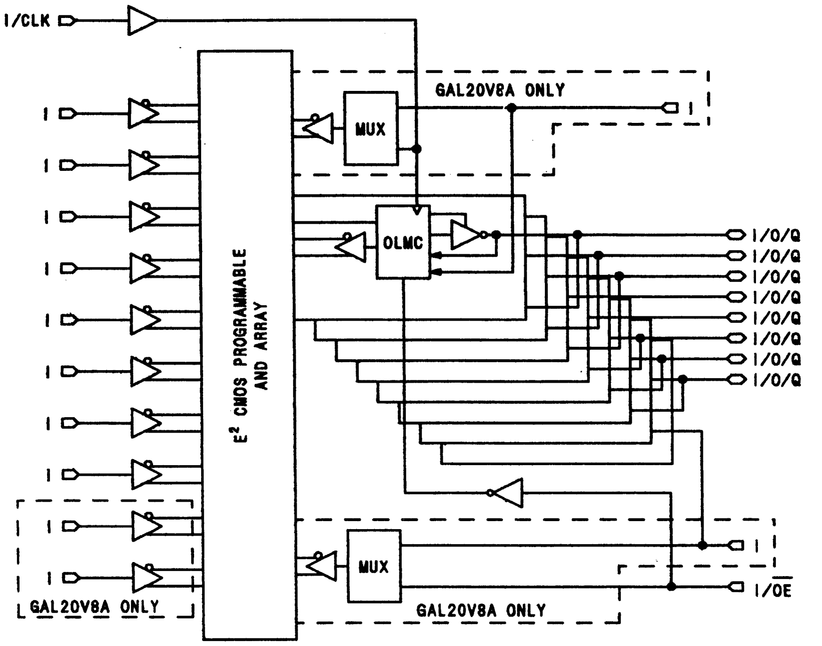
BLOCK DIAGRAM



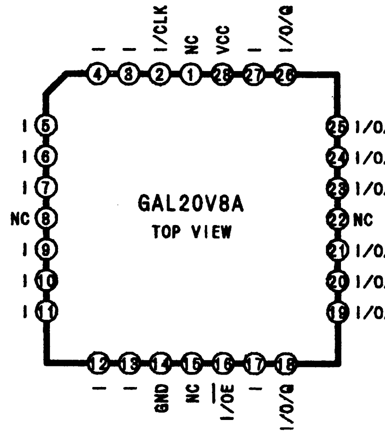
HM628128LFP7
(131.072×8BIT S-RAM)



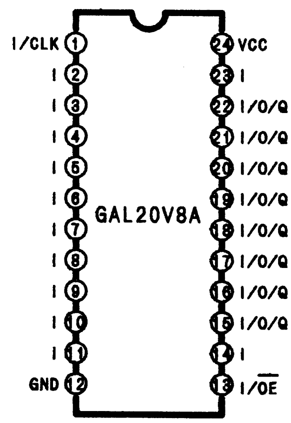
GAL20V8A
(E^2 CMOS PROGRAMMABLE AND ARRAY (64x40))



CHIP CARRIER

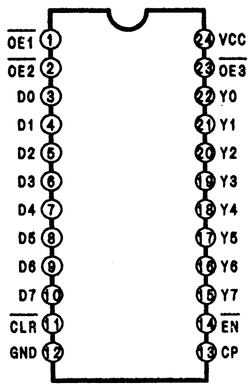


DIP



IDTFCT825AS0
(LATCH)

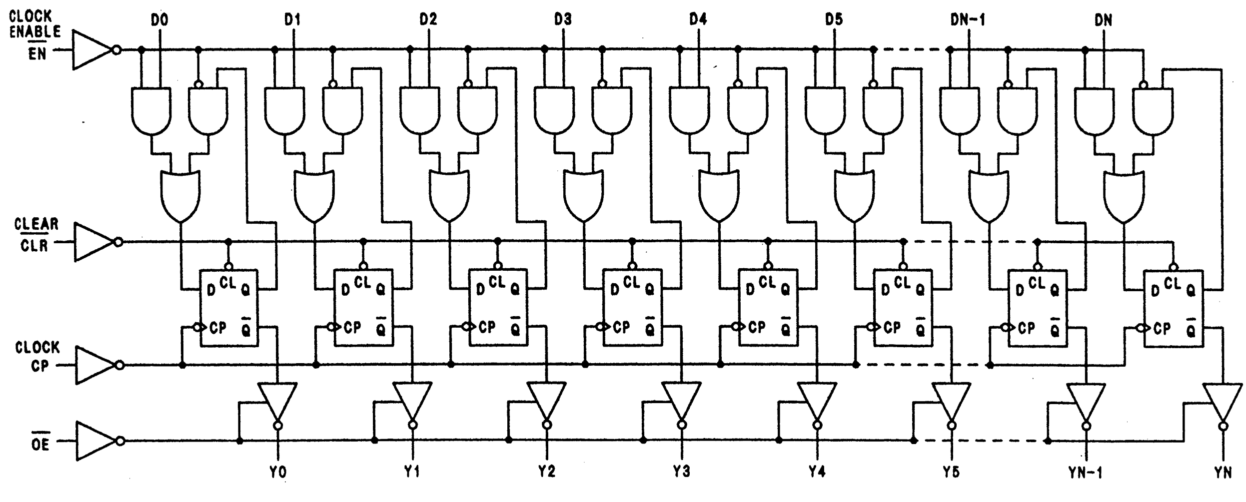
(TOP VIEW)



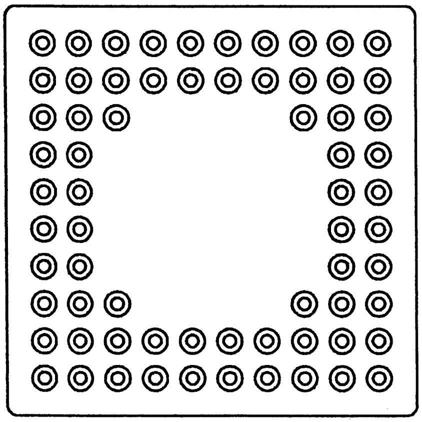
TRUTH TABLE

INPUTS					INTERNAL OUTPUTS		FUNCTION
$\overline{OE}$	$\overline{CLR}$	$\overline{EN}$	D1	CP	Q1	Y1	
H	X	L	L	↑	L	Z	HIGH Z
H	X	L	H	↑	H	Z	
H	L	X	X	X	L	Z	CLEAR
L	L	X	X	X	L	L	
H	H	H	X	X	NC	Z	HOLD
L	H	H	X	X	NC	NC	
H	H	L	L	↑	L	Z	LOAD
H	H	L	H	↑	H	Z	
L	H	L	L	↑	L	L	
L	H	L	H	↑	H	H	

NOTE:
1. H=HIGH, L=LOW, X=DON'T CARE, NC=NO CHANGE, ↑=LOW-TO-HIGH TRANSITION, Z=HIGH IMPEDANCE



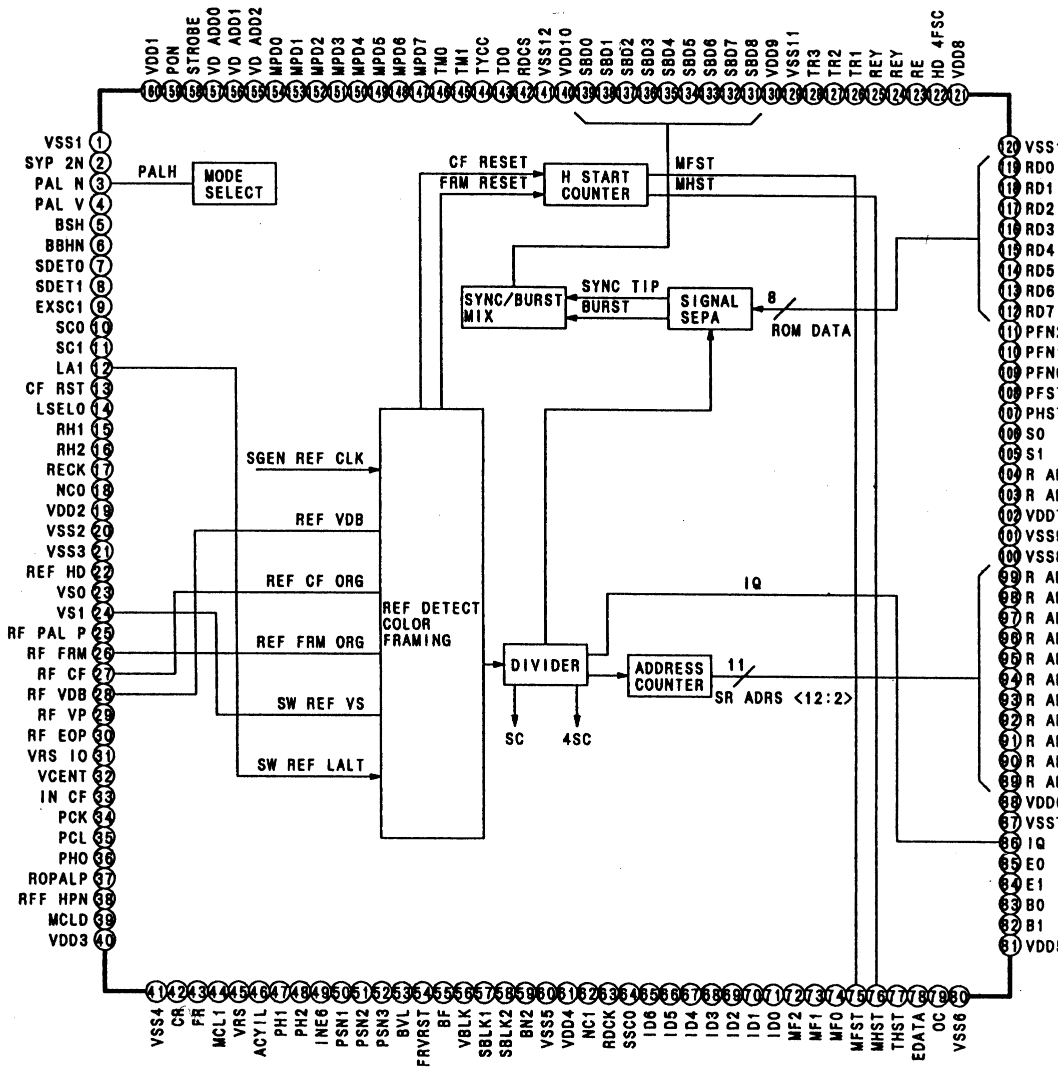
HD68000Y10
(16 BIT CPU)



PGA 68PIN

PIN ON.	SIGNAL NAME	I/O	PIN ON.	SIGNAL NAME	I/O	PIN ON.	SIGNAL NAME	I/O	PIN ON.	SIGNAL NAME	I/O
1	—	-	18	A9	O	35	D1	I/O	52	A12	O
2	DTACK	I	19	—	-	36	AS	O	53	A15	O
3	BGACK	I	20	A14	O	37	LDS	O	54	A18	O
4	BR	I	21	A16	O	38	BG	O	55	VCC	-
5	CLK		22	A17	O	39	VCC	-	56	VSS	-
6	HALT	I/O	23	A19	O	40	VSS	-	57	A23	O
7	VMA	O	24	A20	O	41	RES	I/O	58	D14	I/O
8	E	O	25	A21	O	42	VPA	I	59	D11	I/O
9	BERR	I	26	A22	O	43	IPL2	I	60	D9	I/O
10	—	-	27	D15	I/O	44	IPL0	I	61	D6	I/O
11	FC2	O	28	D12	I/O	45	FC1	O	62	D3	I/O
12	FC0	O	29	D10	I/O	46	—	-	63	D0	I/O
13	A1	O	30	D8	I/O	47	A2	O	64	UDS	O
14	A3	O	31	D7	I/O	48	A5	O	65	R/W	O
15	A4	O	32	D5	I/O	49	A8	O	66	IPL1	I
16	A6	O	33	D4	I/O	50	A10	O	67	A13	O
17	A7	O	34	D2	I/O	51	A11	O	68	D13	I/O

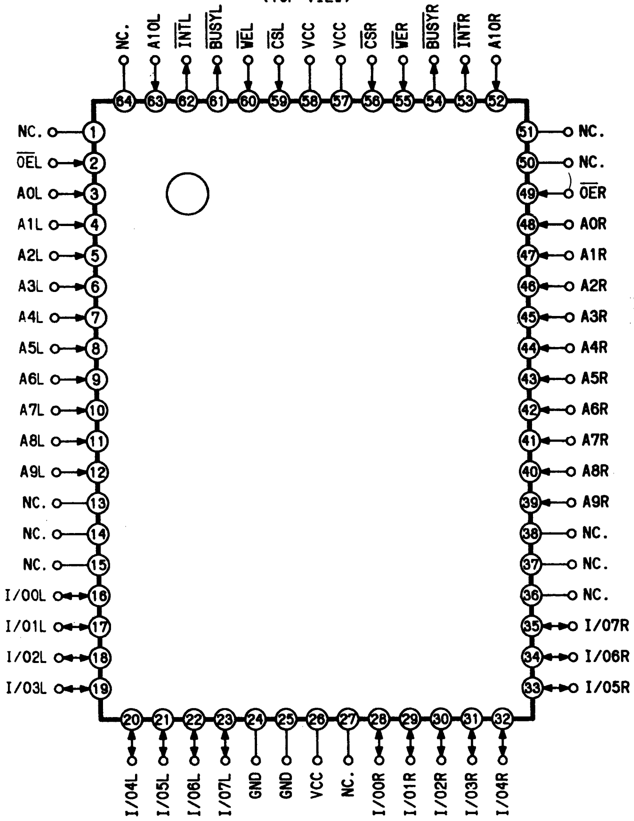
L7A0543
(SYS SYNC GENERATOR)

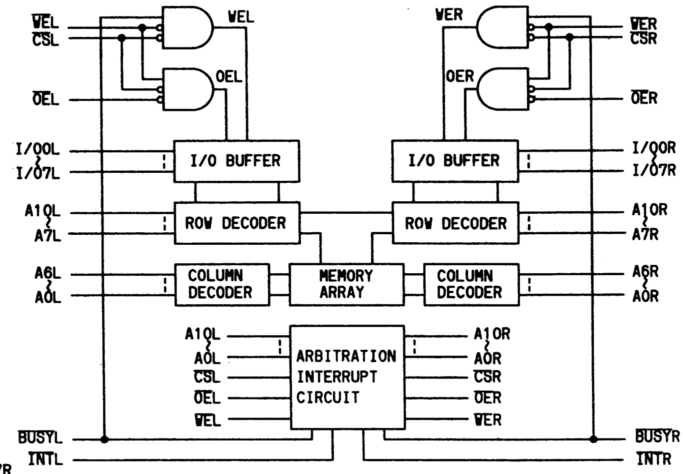


MB8421-90LPF

(16K BIT DUAL PORT STATIC RAM)

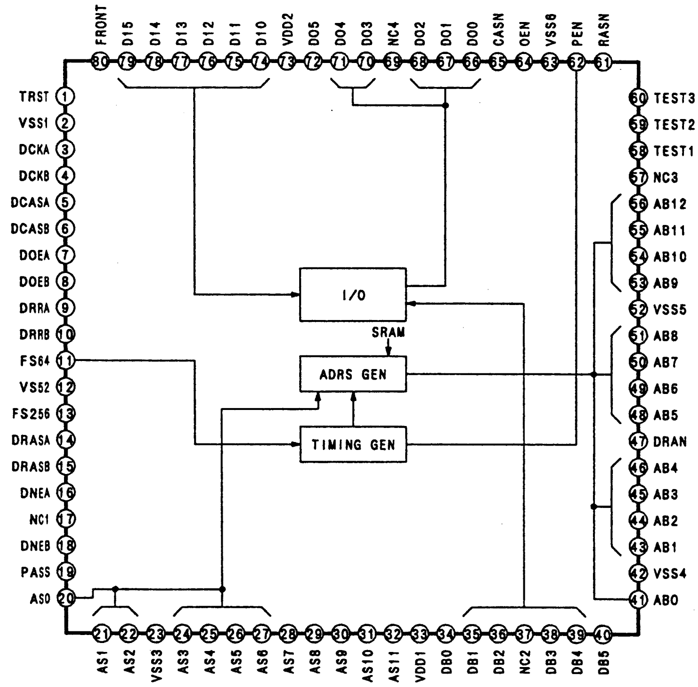
(TOP VIEW)



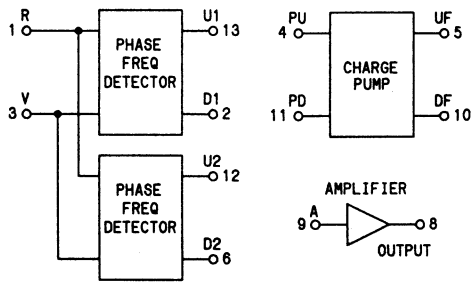


MB621926

(DELAY FOR DIGITAL AUDIO)



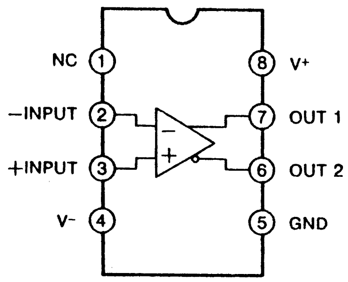
MC4044



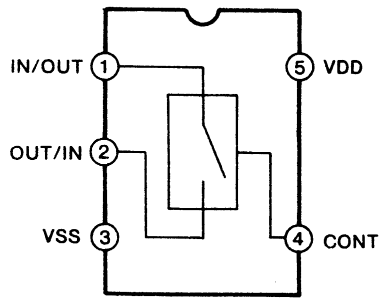
TRUTH TABLE

INPUT STATE	INPUT		OUTPUT			
	R	V	U1	D1	U2	D2
1	0	0	×	×	1	1
2	1	0	×	×	0	1
3	1	1	×	×	1	0
4	1	0	×	×	0	1
5	0	0	×	×	1	1
6	1	0	×	×	0	1
7	0	0	×	×	1	1
8	1	0	×	×	0	1
9	0	0	0	1	1	1
10	0	1	0	1	1	1
11	0	0	1	1	1	1
12	0	1	1	1	1	1
13	0	0	1	0	1	1
14	0	1	1	0	1	1
15	0	0	1	0	1	1
16	1	0	1	0	0	1
17	0	0	1	1	1	1

NJM360M
(OP AMP)

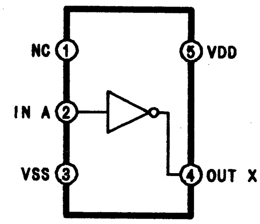


TC4S66F
(BILATERAL SWITCH)



TC4S69F
(INVETER GATE)

(TOP VIEW)



Service Manual

Modules

- *Block Diagrams*
- *Printed Circuit Boards*
- *Schematic Diagrams*

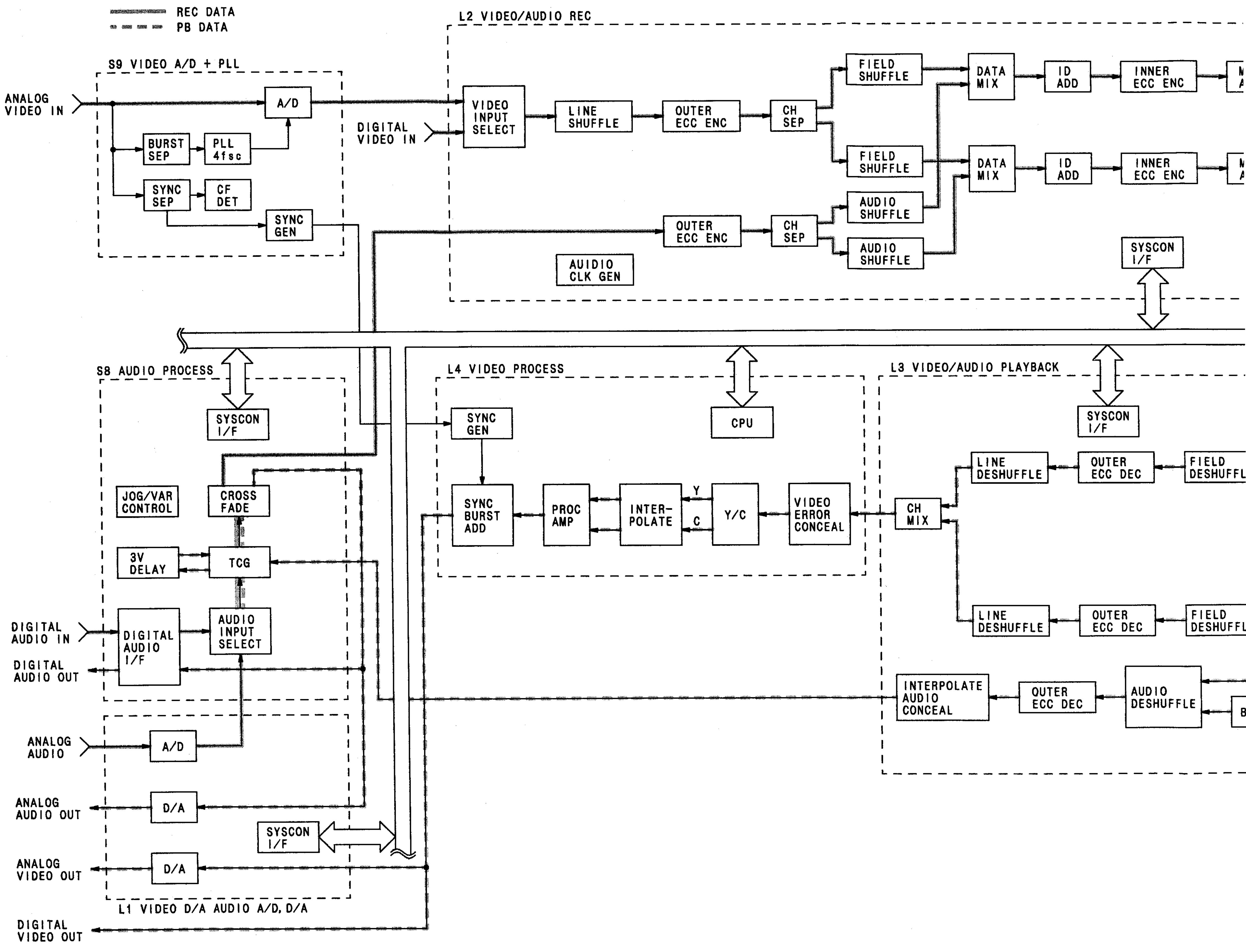
Note:
1. Do not use the part number shown on the schematic diagram or P.C.Board layout for ordering.
   The correct part number for ordering is shown in the Exploded Views/Parts List section.
2. Unless otherwise specified, all resistors are in OHMS,
   K=1,000 OHMS, all capacitors are in MICROFARADS (μF), P=$\mu\mu$F.

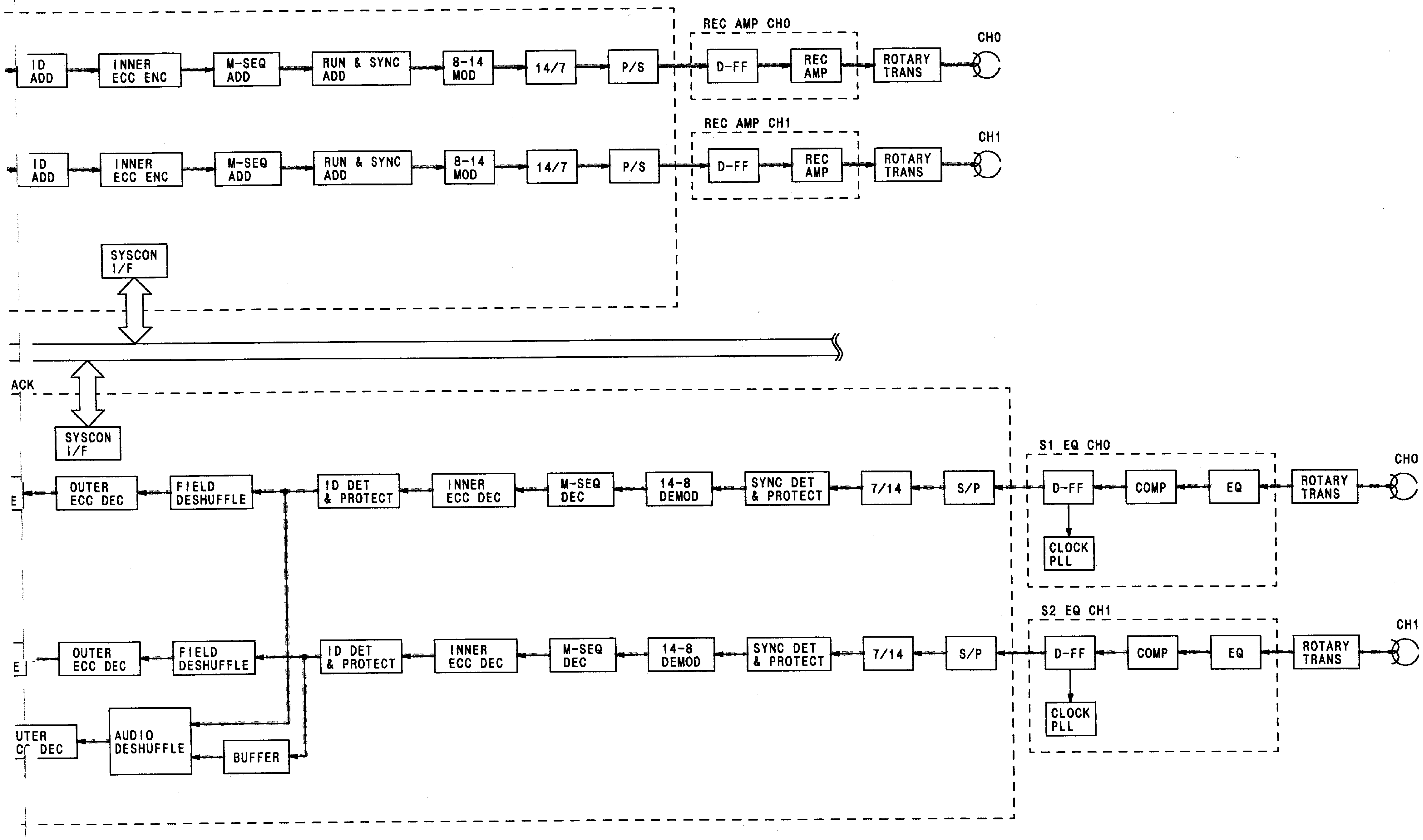
Panasonic
Broadcast Systems

CONTENTS

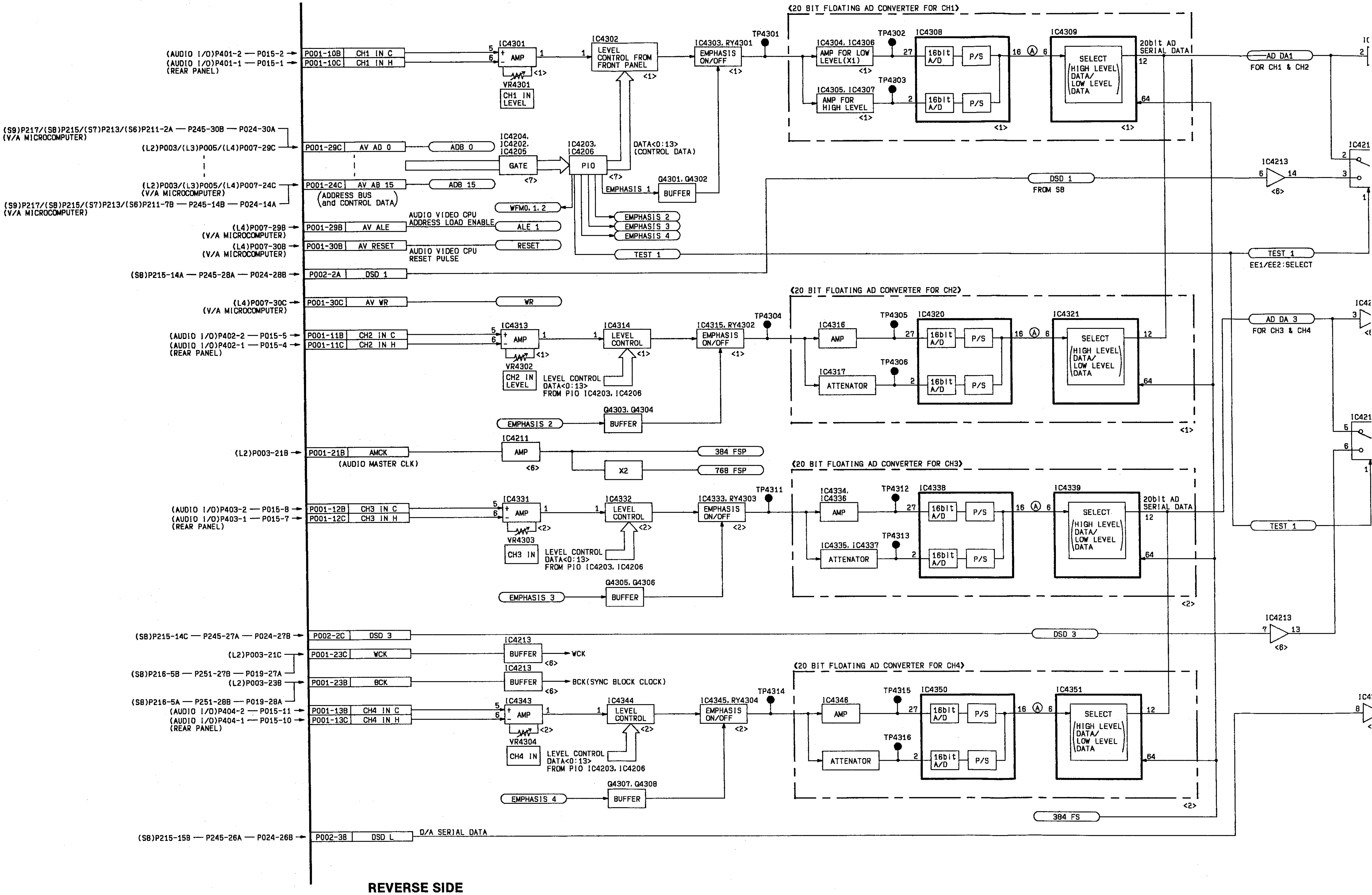
CIRCUIT BOARD DIAGRAMS

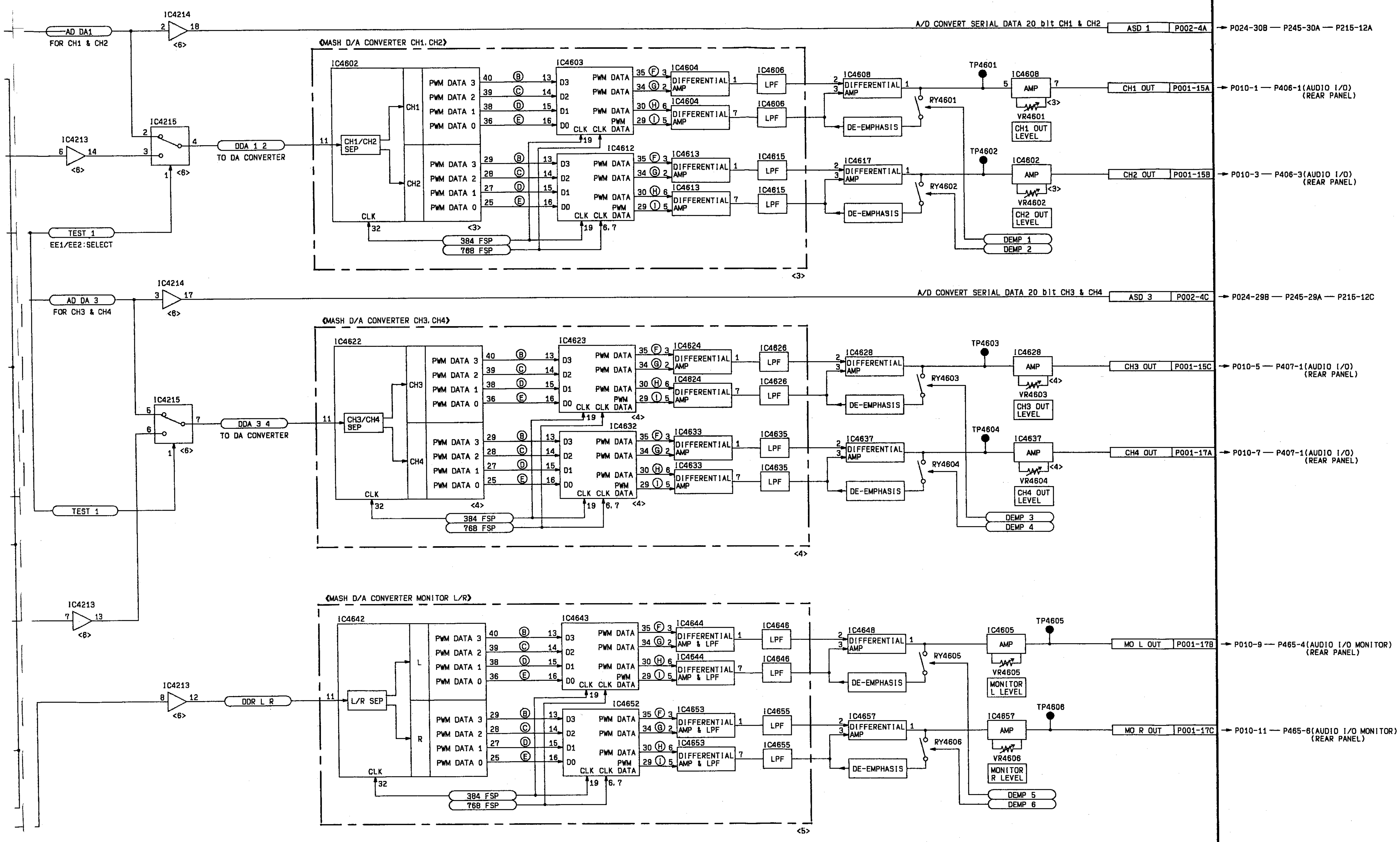
AUDIO/VIDEO OVERALL BLOCK DIAGRAM




REC AMP CH0
CH0
ID ADD
INNER ECC ENC
M-SEQ ADD
RUN & SYNC ADD
8-14 MOD
14/7
P/S
D-FF
REC AMP
ROTARY TRANS
REC AMP CH1
CH1
SYSCON I/F
ACK
S1 EQ CH0
OUTER ECC DEC
FIELD DESHUFFLE
ID DET & PROTECT
INNER ECC DEC
M-SEQ DEC
14-8 DEMOD
SYNC DET & PROTECT
7/14
S/P
COMP
EQ
CLOCK PLL
S2 EQ CH1
AUDIO DESHUFFLE
BUFFER
UTER
DEC

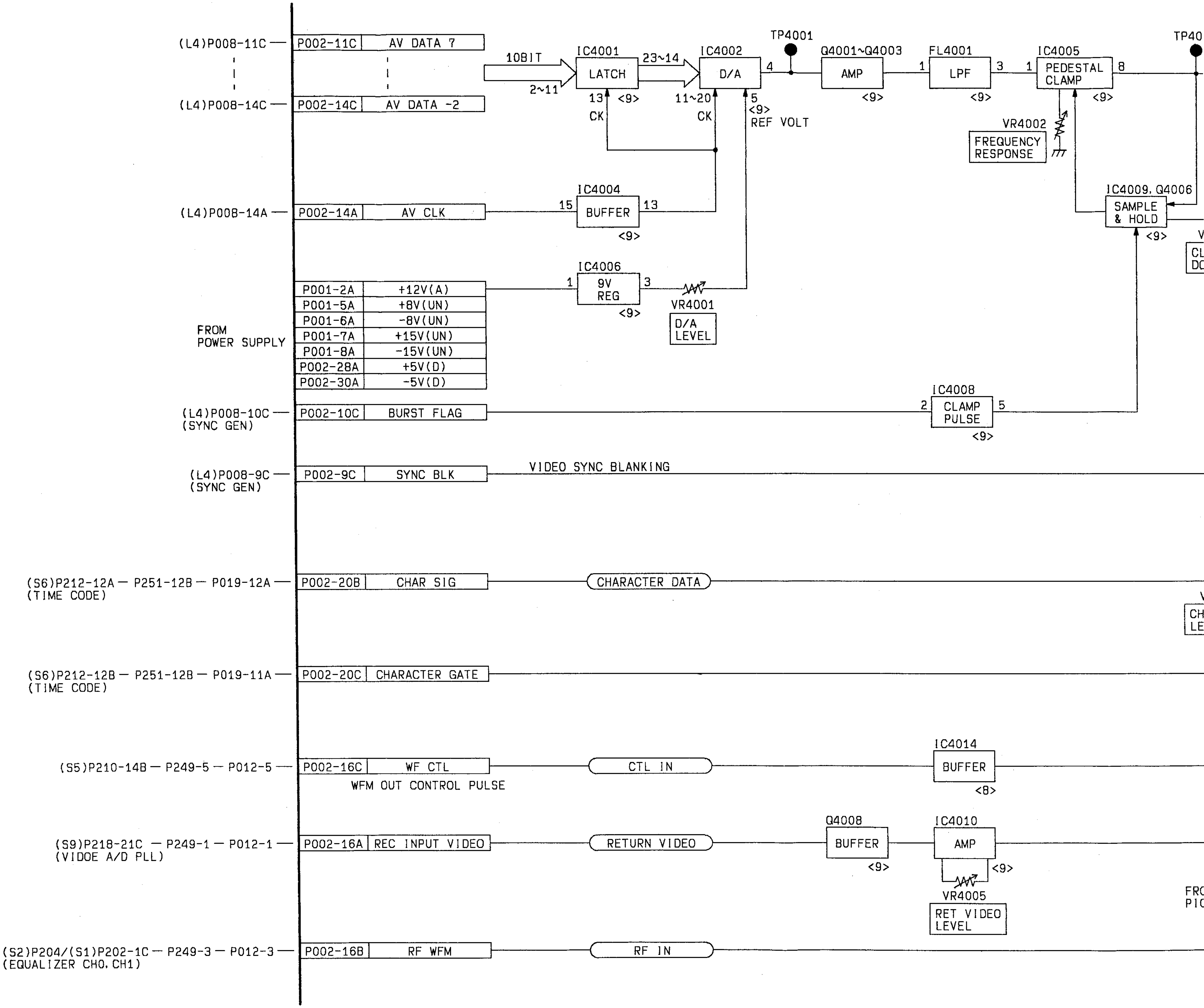
L1 AUDIO A/D, D/A, VIDEO D/A BLOCK DIAGRAM (AUDIO A/D, D/A SECTION)

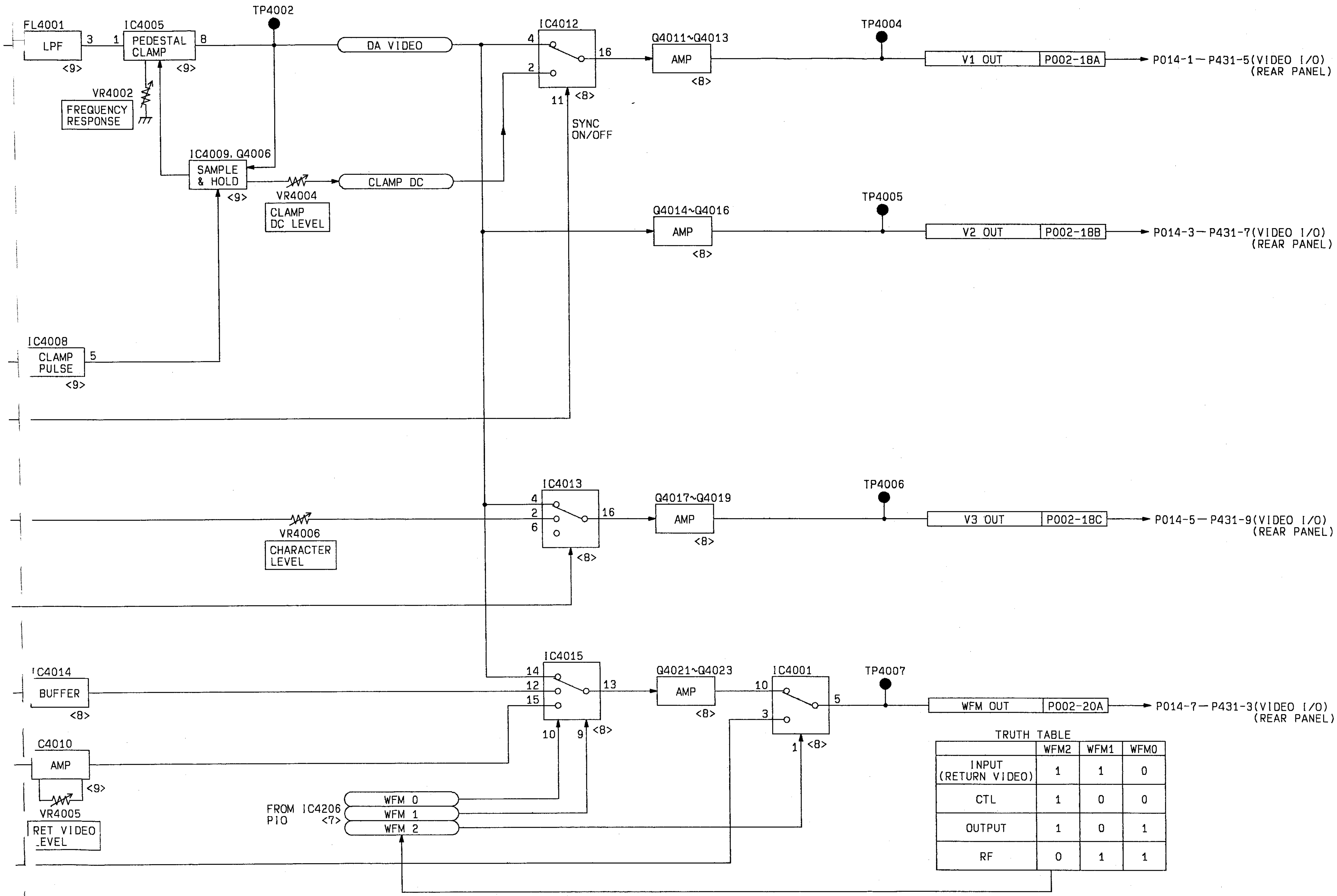




AD DA1
FOR CH1 & CH2
IC4214
IC4215
IC4213
DDA 1 2
TO DA CONVERTER
TEST 1
EE1/EE2:SELECT
MASH D/A CONVERTER CH1, CH2
IC4602
CH1/CH2 SEP
PWM DATA 3
PWM DATA 2
PWM DATA 1
PWM DATA 0
IC4603
IC4612
DIFFERENTIAL AMP
LPF
DE-EMPHASIS
AMP
CH1 OUT LEVEL
CH2 OUT LEVEL
384 FSP
768 FSP
DEMP 1
DEMP 2
A/D CONVERT SERIAL DATA 20 bit CH1 & CH2
ASD 1
P002-4A
P024-30B — P245-30A — P215-12A
CH1 OUT
P001-15A
P010-1 — P406-1(AUDIO I/O) (REAR PANEL)
CH2 OUT
P001-15B
P010-3 — P406-3(AUDIO I/O) (REAR PANEL)
AD DA 3
FOR CH3 & CH4
DDA 3 4
MASH D/A CONVERTER CH3, CH4
CH3/CH4 SEP
A/D CONVERT SERIAL DATA 20 bit CH3 & CH4
ASD 3
P002-4C
P024-29B — P245-29A — P216-12C
CH3 OUT
P001-15C
P010-5 — P407-1(AUDIO I/O) (REAR PANEL)
CH4 OUT
P001-17A
P010-7 — P407-1(AUDIO I/O) (REAR PANEL)
CH3 OUT LEVEL
CH4 OUT LEVEL
DEMP 3
DEMP 4
MASH D/A CONVERTER MONITOR L/R
DDR L R
L/R SEP
DIFFERENTIAL AMP & LPF
MONITOR L LEVEL
MONITOR R LEVEL
MO L OUT
P001-17B
P010-9 — P465-4(AUDIO I/O MONITOR) (REAR PANEL)
MO R OUT
P001-17C
P010-11 — P465-6(AUDIO I/O MONITOR) (REAR PANEL)
DEMP 5
DEMP 6

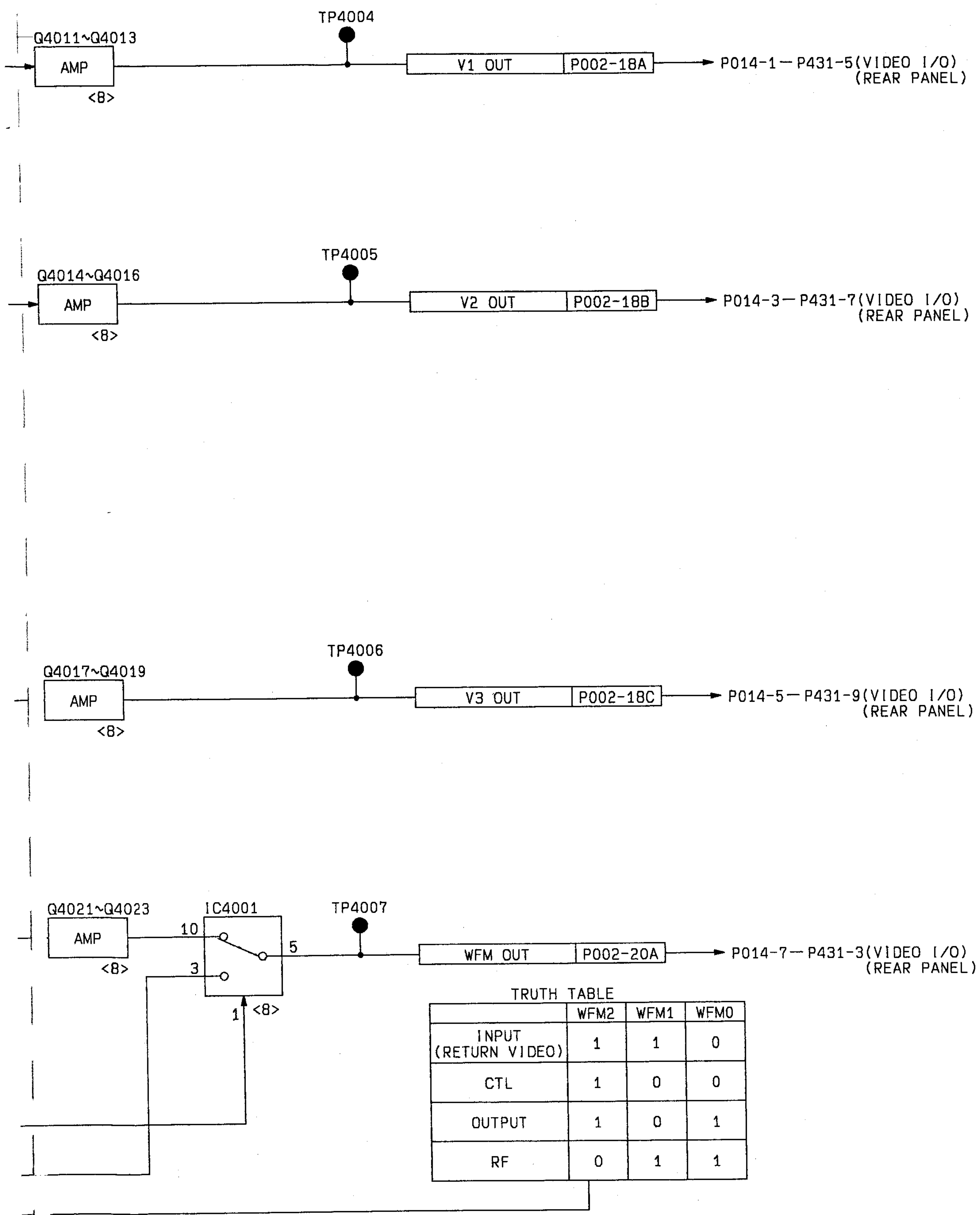
L1 AUDIO A/D, D/A, VIDEO D/A BLOCK DIAGRAM (VIDEO D/A SECTION)





TRUTH TABLE

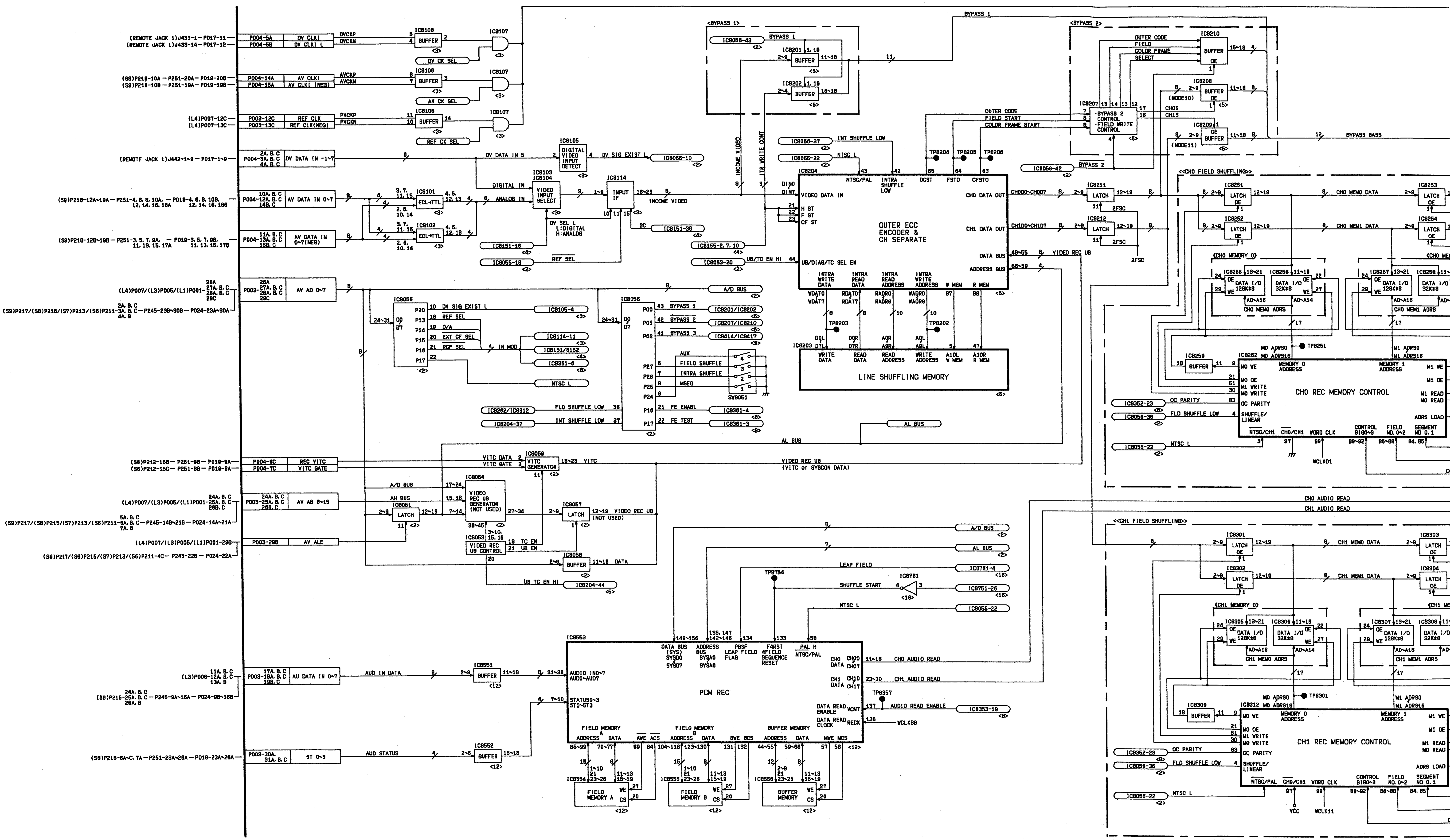
	WFM2	WFM1	WFM0
INPUT (RETURN VIDEO)	1	1	0
CTL	1	0	0
OUTPUT	1	0	1
RF	0	1	1

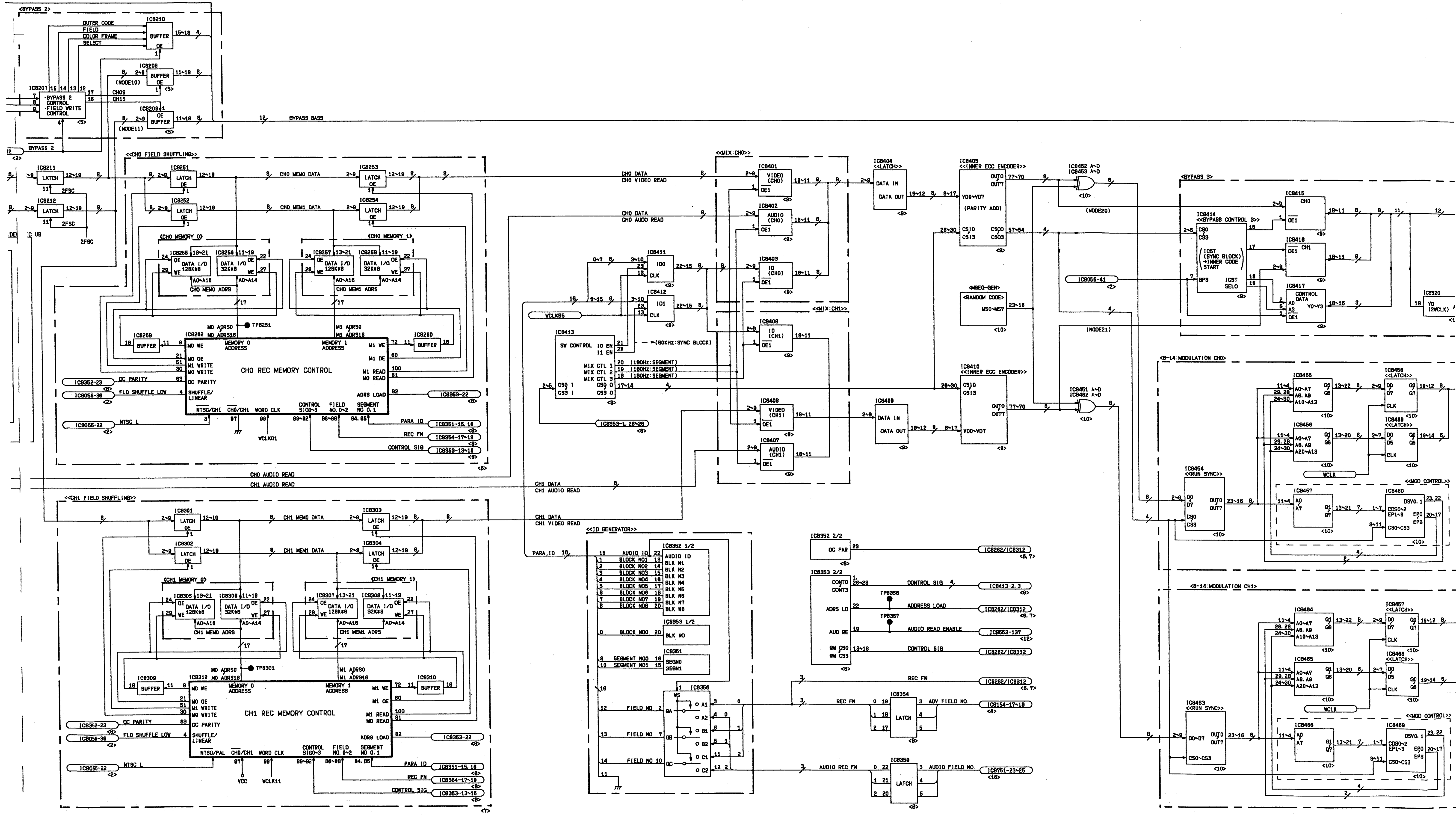


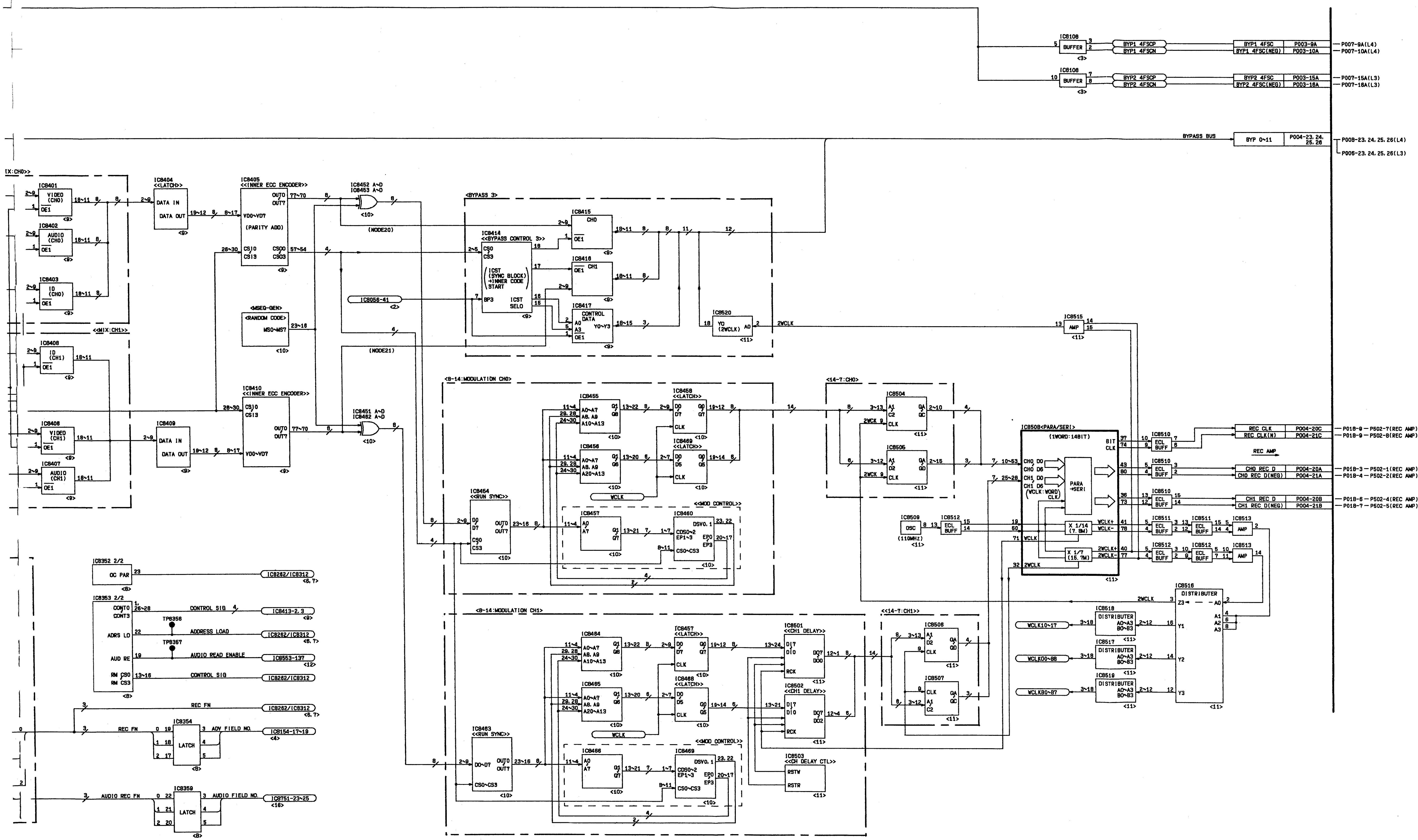
TRUTH TABLE

	WFM2	WFM1	WFM0
INPUT (RETURN VIDEO)	1	1	0
CTL	1	0	0
OUTPUT	1	0	1
RF	0	1	1

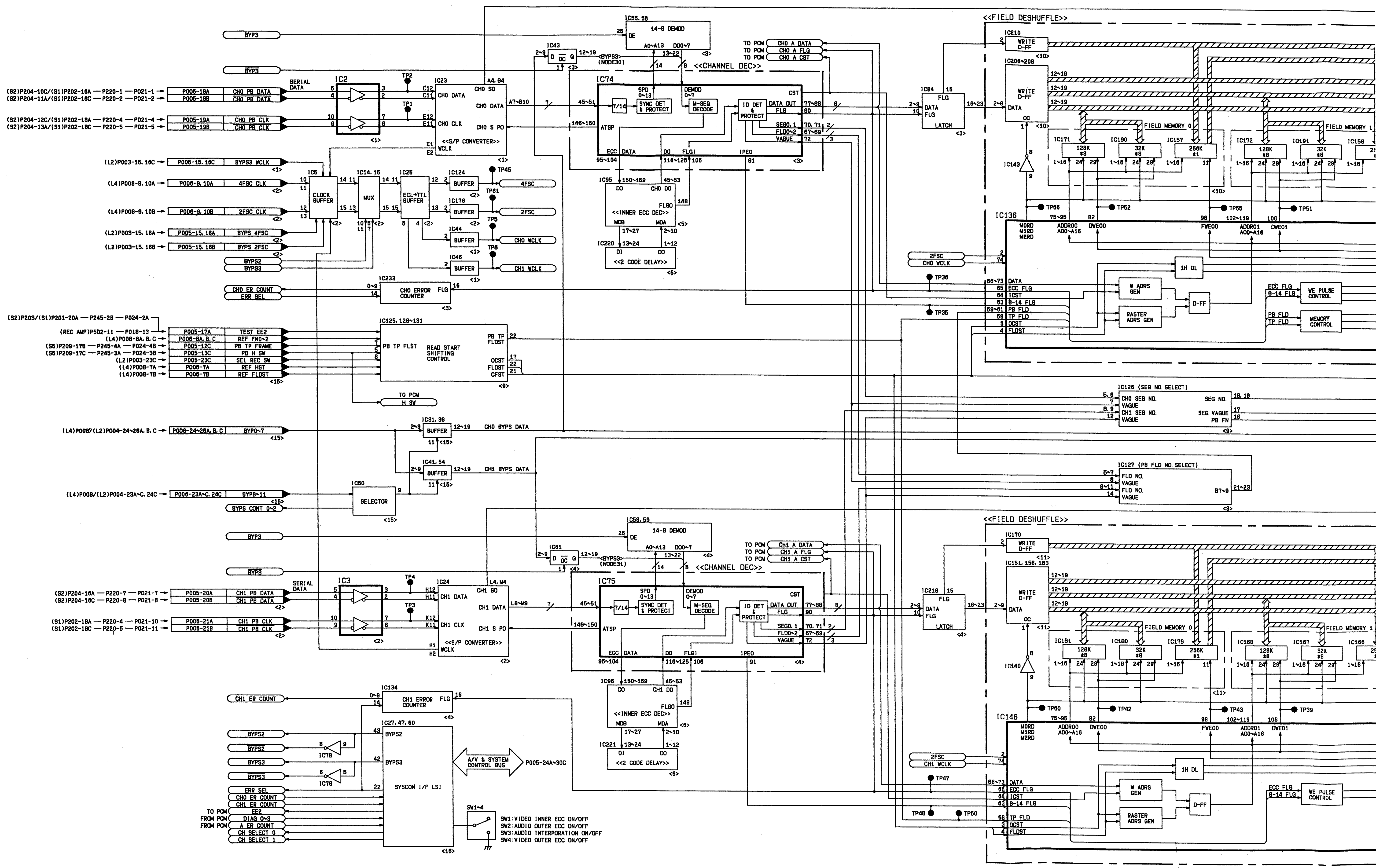
L2 VIDEO/AUDIO REC BLOCK DIAGRAM

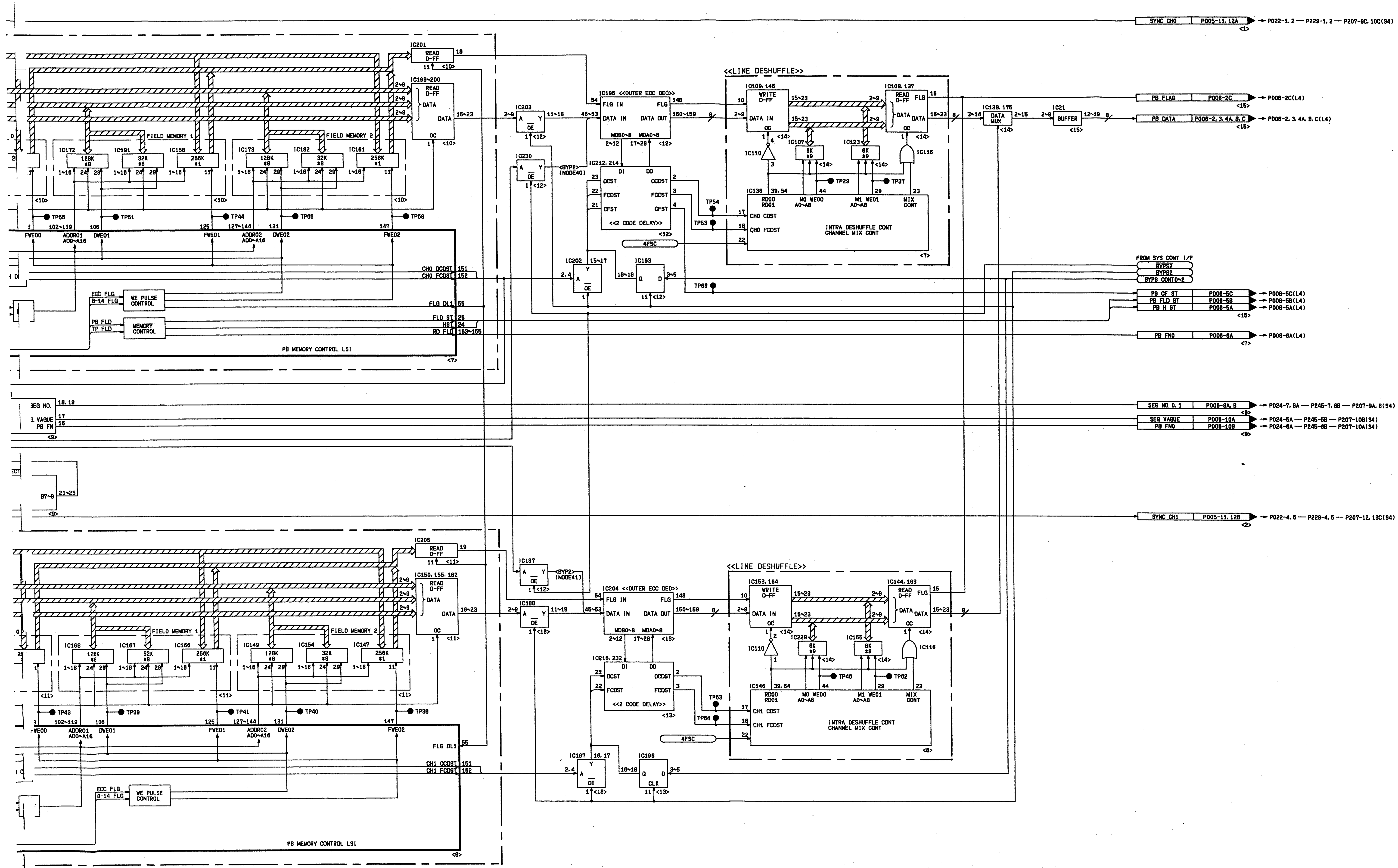




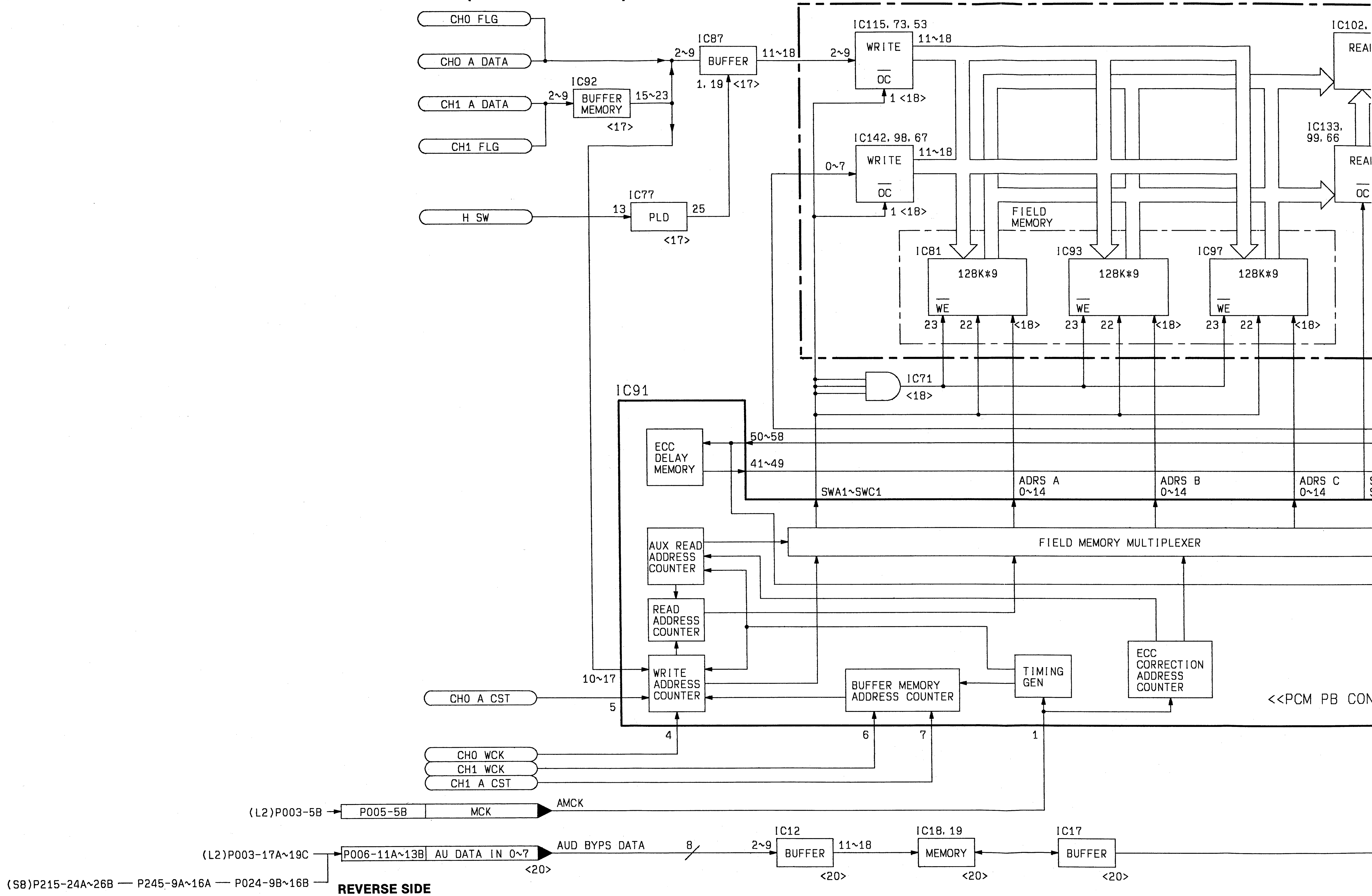


L3 VIDEO/AUDIO PLAYBACK BLOCK DIAGRAM



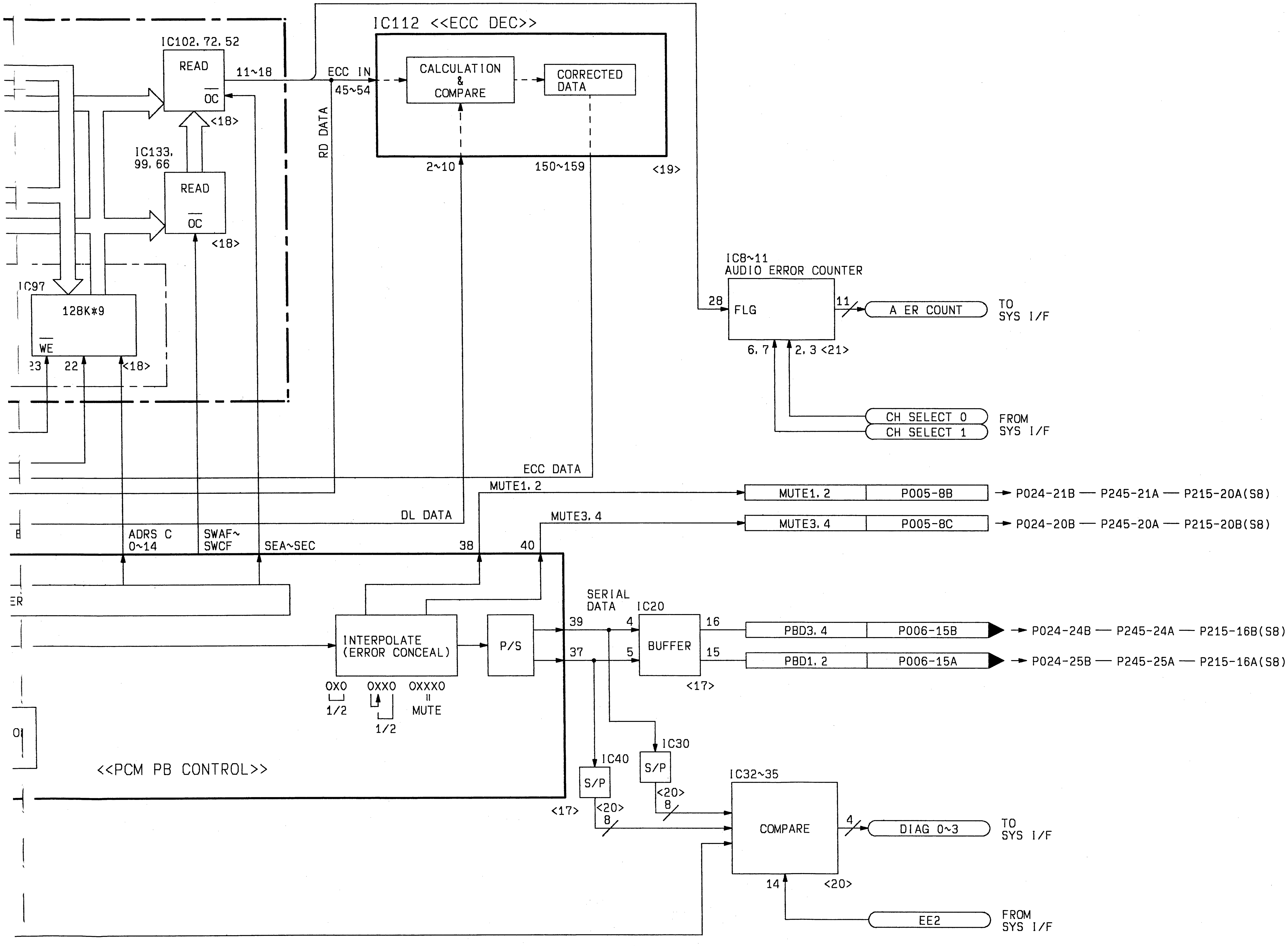

SYNC CH0
P005-11, 12A
P022-1, 2 — P229-1, 2 — P207-9C, 10C(S4)
IC201
READ D-FF
IC198~200
IC195 <<OUTER ECC DEC>>
FLG IN
DATA IN
DATA OUT
IC203
IC230
(BYP2)
(NODE40)
IC212, 214
OCST
FCDST
CFST
<<2 CODE DELAY>>
4FSC
<<LINE DESHUFFLE>>
IC109, 145
WRITE D-FF
IC108, 137
IC110
IC107
IC123
IC116
IC136
INTRA DESHUFFLE CONT
CHANNEL MIX CONT
CH0 CDST
CH0 FCDST
MIX CONT
TP29
TP37
TP54
TP53
TP68
IC138, 175
DATA MUX
IC21
BUFFER
PB FLAG
P006-2C
P008-2C(L4)
PB DATA
P006-2, 3, 4A, B, C
P008-2, 3, 4A, B, C(L4)
FROM SYS CONT I/F
BYPS2
BYPS CONT0~2
PB CF ST
P006-5C
P008-5C(L4)
PB FLD ST
P006-5B
P008-5B(L4)
PB H ST
P006-5A
P008-5A(L4)
PB FNO
P006-6A
P008-6A(L4)
IC202
IC193
IC172
IC191
IC158
IC173
IC192
IC161
128K
32K
256K
FIELD MEMORY 1
FIELD MEMORY 2
TP55
TP51
TP44
TP65
TP59
FWE00
ADDR01
A00~A16
DWE01
FWE01
ADDR02
DWE02
FWE02
CH0 OCDST
CH0 FCDST
ECC FLG
8-14 FLG
WE PULSE CONTROL
PB FLD
TP FLD
MEMORY CONTROL
FLG DL1
FLD ST
HST
RD FLD
PB MEMORY CONTROL LSI
SEG NO.
3. VAGUE
PB FN
SEG NO. 0, 1
P005-9A, B
P024-7, 8A — P245-7, 8B — P207-9A, B(S4)
SEG VAGUE
P005-10A
P024-5A — P245-5B — P207-10B(S4)
PB FNO
P005-10B
P024-6A — P245-6B — P207-10A(S4)
B7~8
SYNC CH1
P005-11, 12B
P022-4, 5 — P229-4, 5 — P207-12, 13C(S4)
IC205
IC150, 155, 182
IC187
(BYP2)
(NODE41)
IC188
IC204 <<OUTER ECC DEC>>
IC216, 232
<<LINE DESHUFFLE>>
IC153, 164
IC144, 163
IC228
IC165
IC146
CH1 CDST
CH1 FCDST
TP46
TP62
TP63
TP64
IC168
IC167
IC166
IC149
IC154
IC147
TP43
TP39
TP41
TP40
TP38
CH1 OCDST
CH1 FCDST
IC197
IC196
CLK
PB MEMORY CONTROL LSI

L3 VIDEO/AUDIO PLAYBACK BLOCK DIAGRAM (PCM PROCESS)

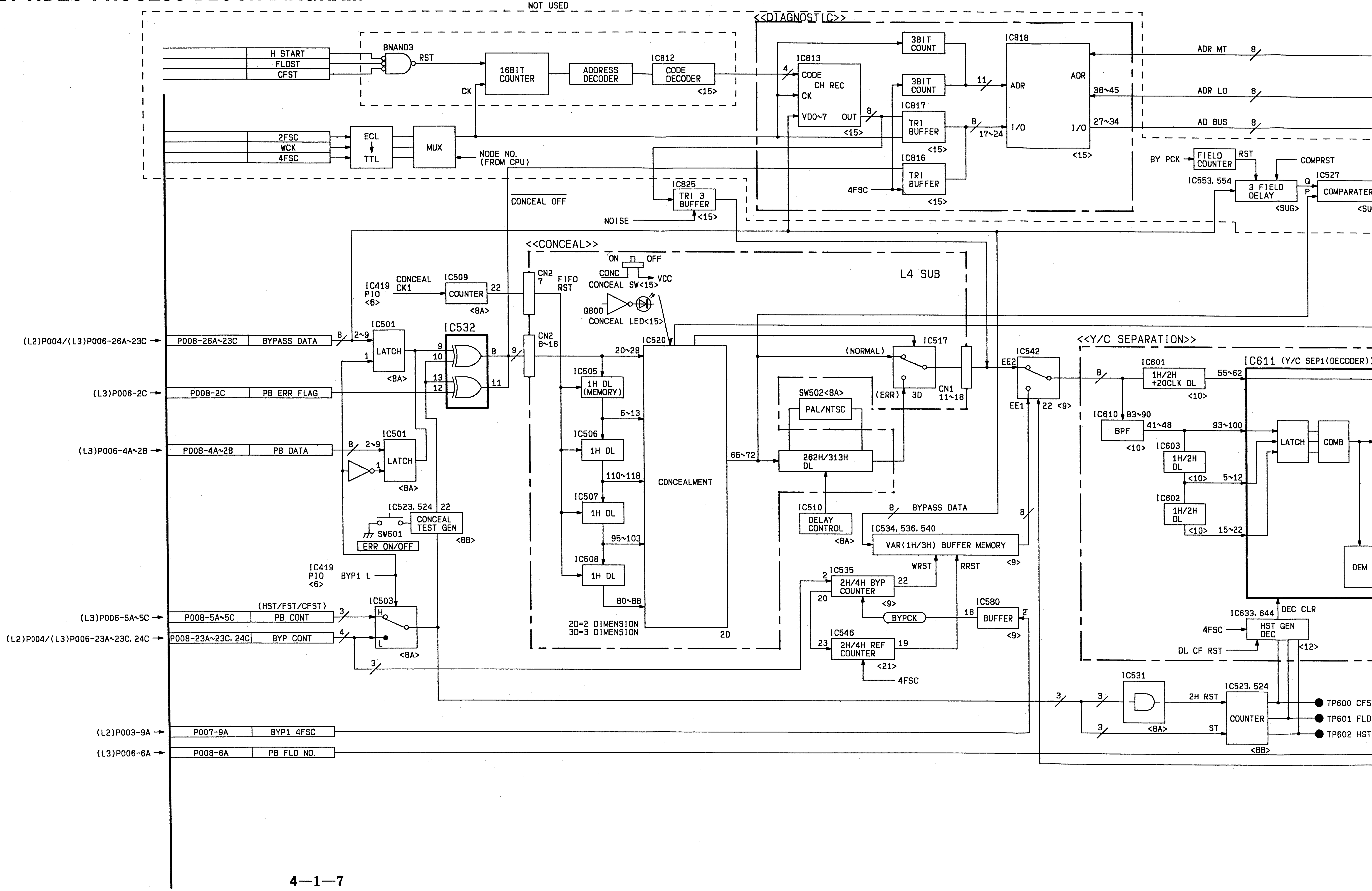


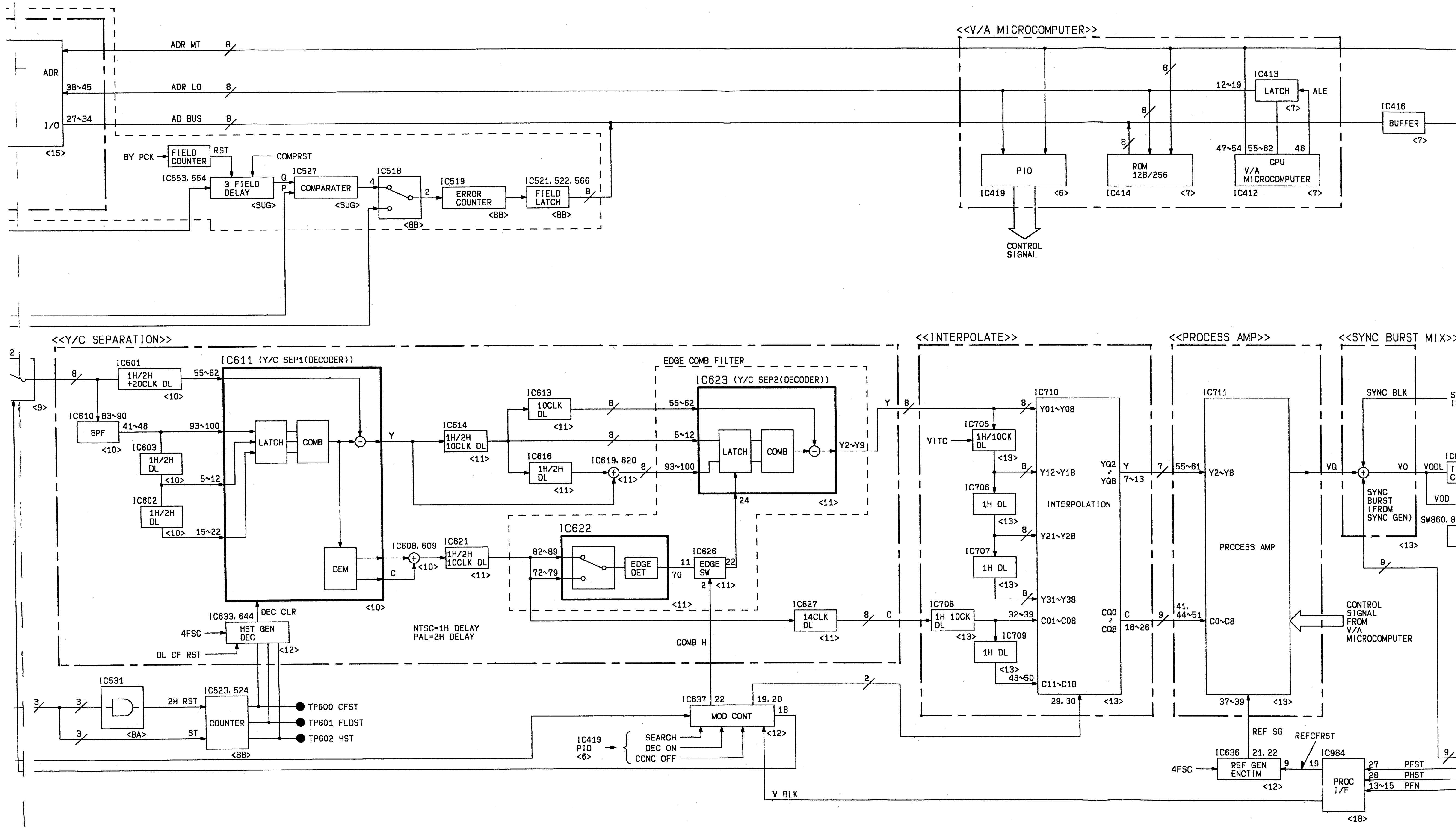
REVERSE SIDE

L3 VIDEO/AUDIO PLAYBACK

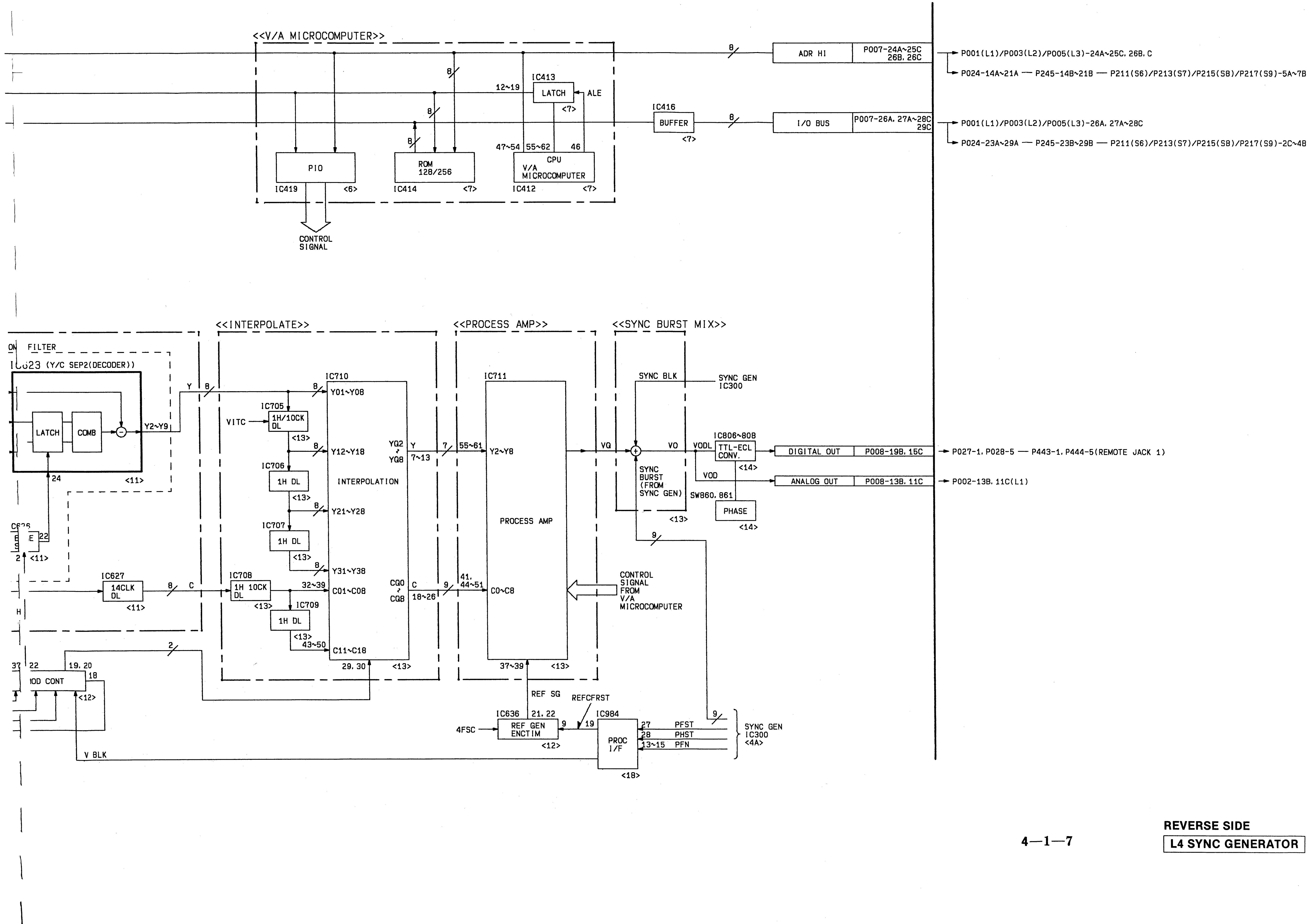

IC112 <<ECC DEC>>
IC102, 72, 52
READ
OC
11~18
<18>
IC133, 99, 66
READ
OC
<18>
IC97
128K*9
WE
23
22
<18>
ECC IN
45~54
RD DATA
CALCULATION & COMPARE
CORRECTED DATA
2~10
150~159
<19>
IC8~11
AUDIO ERROR COUNTER
28
FLG
11
A ER COUNT
TO SYS I/F
6, 7
2, 3 <21>
CH SELECT 0
CH SELECT 1
FROM SYS I/F
ECC DATA
MUTE1, 2
MUTE1, 2
P005-8B
P024-21B — P245-21A — P215-20A(S8)
DL DATA
MUTE3, 4
MUTE3, 4
P005-8C
P024-20B — P245-20A — P215-20B(S8)
ADRS C 0~14
SWAF~ SWCF
SEA~SEC
38
40
SERIAL DATA
IC20
39
4
16
BUFFER
INTERPOLATE (ERROR CONCEAL)
P/S
37
5
15
PBD3, 4
P006-15B
P024-24B — P245-24A — P215-16B(S8)
PBD1, 2
P006-15A
P024-25B — P245-25A — P215-16A(S8)
<17>
OXO
1/2
OXXO
1/2
OXXXO
MUTE
IC30
S/P
IC40
S/P
<<PCM PB CONTROL>>
<17>
<20>
8
<20>
8
IC32~35
COMPARE
4
DIAG 0~3
TO SYS I/F
14
<20>
EE2
FROM SYS I/F

L4 VIDEO PROCESS BLOCK DIAGRAM





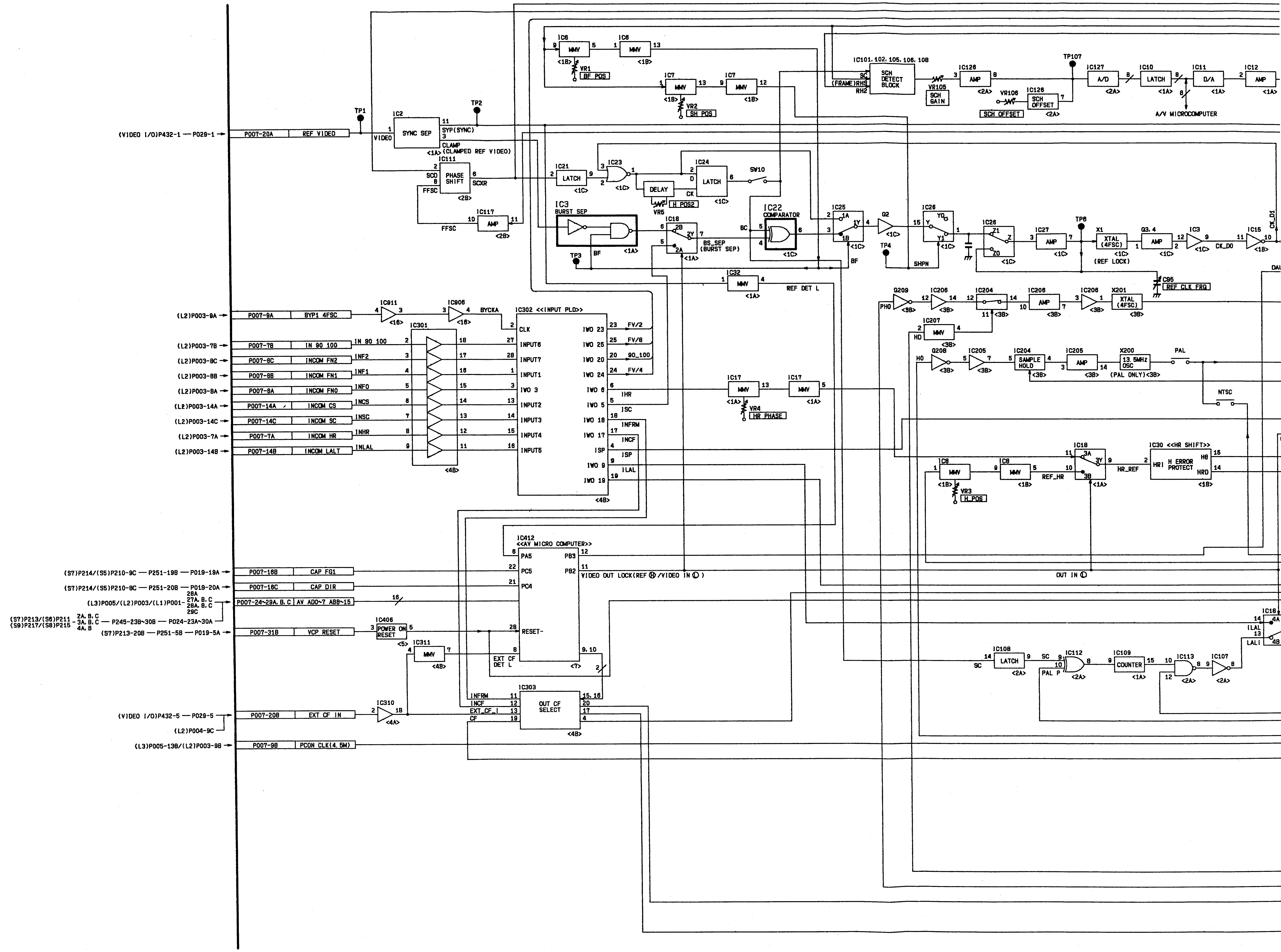
ADR MT
ADR LO
AD BUS
ADR
I/O
BY PCK
FIELD COUNTER
RST
COMPRST
3 FIELD DELAY
IC553, 554
IC527
COMPARATER
IC518
IC519
ERROR COUNTER
IC521, 522, 566
FIELD LATCH
<<V/A MICROCOMPUTER>>
IC413
LATCH
ALE
IC416
BUFFER
PIO
IC419
ROM 128/256
IC414
CPU
V/A MICROCOMPUTER
IC412
CONTROL SIGNAL
<<Y/C SEPARATION>>
IC601
1H/2H +20CLK DL
IC611 (Y/C SEP1(DECODER))
IC610
BPF
IC603
1H/2H DL
IC602
LATCH
COMB
DEM
EDGE COMB FILTER
IC623 (Y/C SEP2(DECODER))
IC613
10CLK DL
IC614
1H/2H 10CLK DL
IC616
IC619, 620
IC608, 609
IC621
IC622
EDGE DET
IC626
EDGE SW
IC627
14CLK DL
IC633, 644
HST GEN DEC
DEC CLR
4FSC
DL CF RST
NTSC=1H DELAY
PAL=2H DELAY
COMB H
<<INTERPOLATE>>
IC710
VITC
IC705
1H/10CK DL
IC706
1H DL
IC707
IC708
1H 10CK DL
IC709
INTERPOLATION
<<PROCESS AMP>>
IC711
PROCESS AMP
<<SYNC BURST MIX>>
SYNC BLK
SYNC BURST (FROM SYNC GEN)
CONTROL SIGNAL FROM V/A MICROCOMPUTER
IC531
2H RST
IC523, 524
COUNTER
TP600 CFST
TP601 FLDST
TP602 HST
IC637
MOD CONT
IC419 PIO <6>
SEARCH
DEC ON
CONC OFF
V BLK
IC636
REF GEN ENCTIM
REF SG
REFCFRST
IC984
PROC I/F
PFST
PHST
PFN

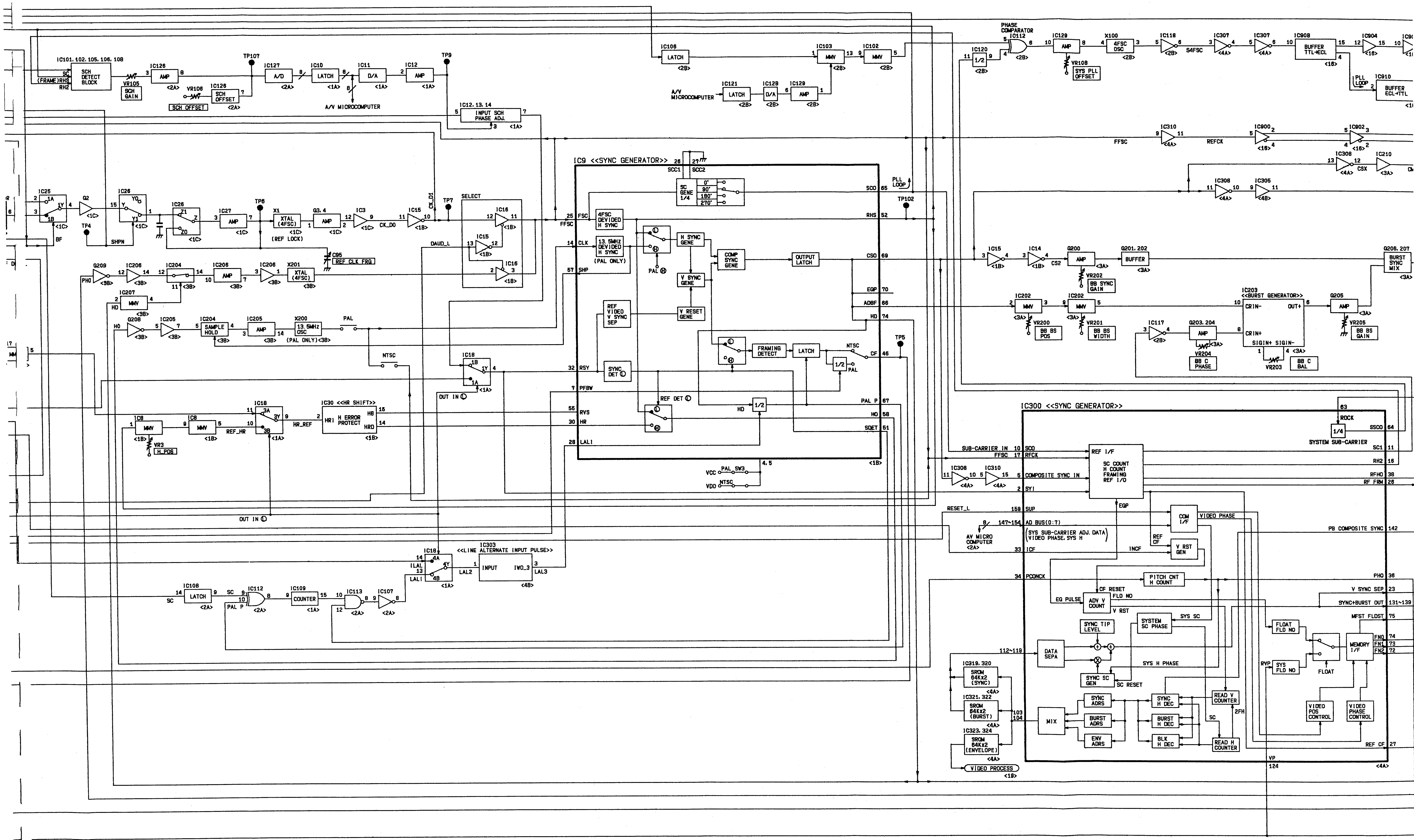


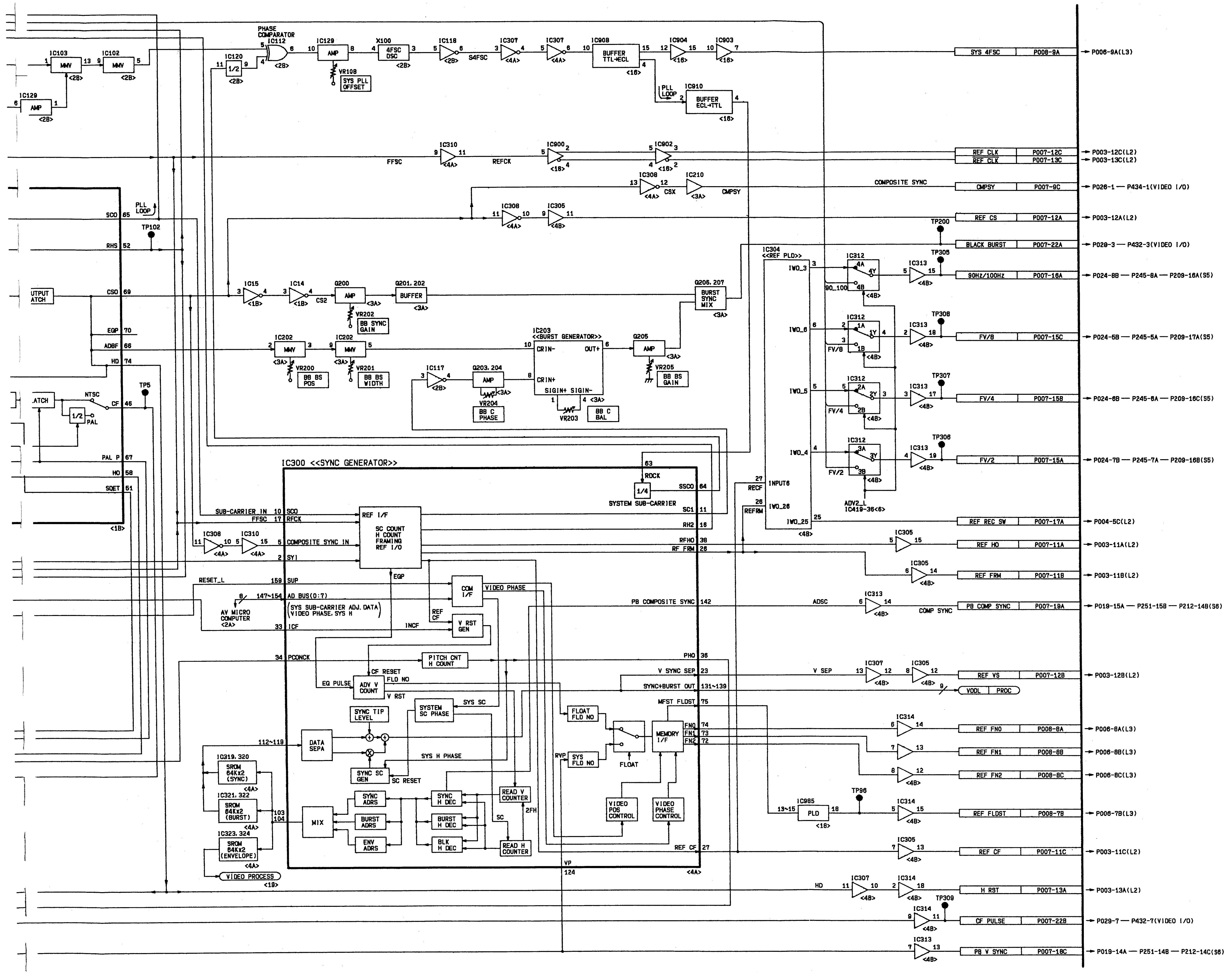
REVERSE SIDE

L4 SYNC GENERATOR

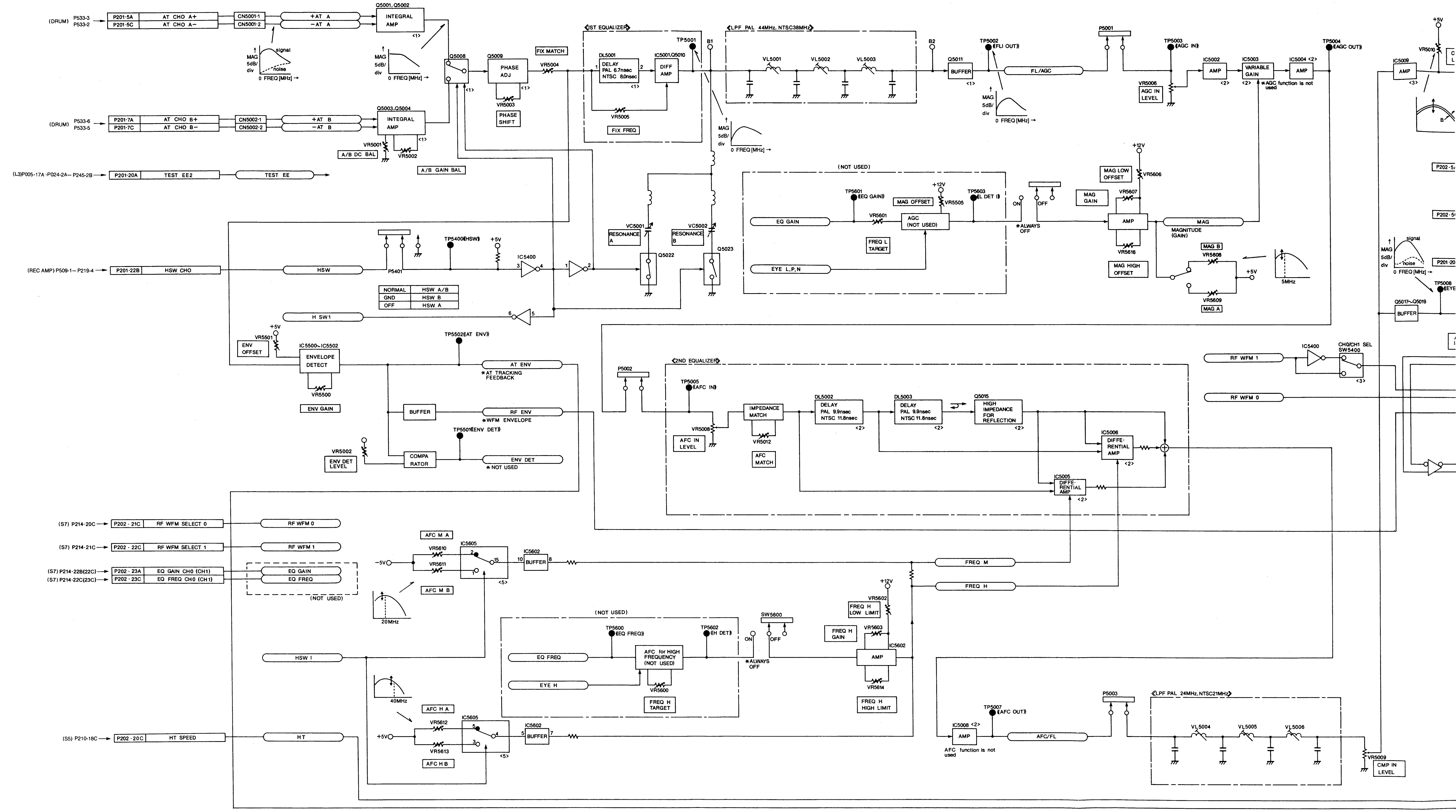
L4 SYNC GENERATOR BLOCK DIAGRAM

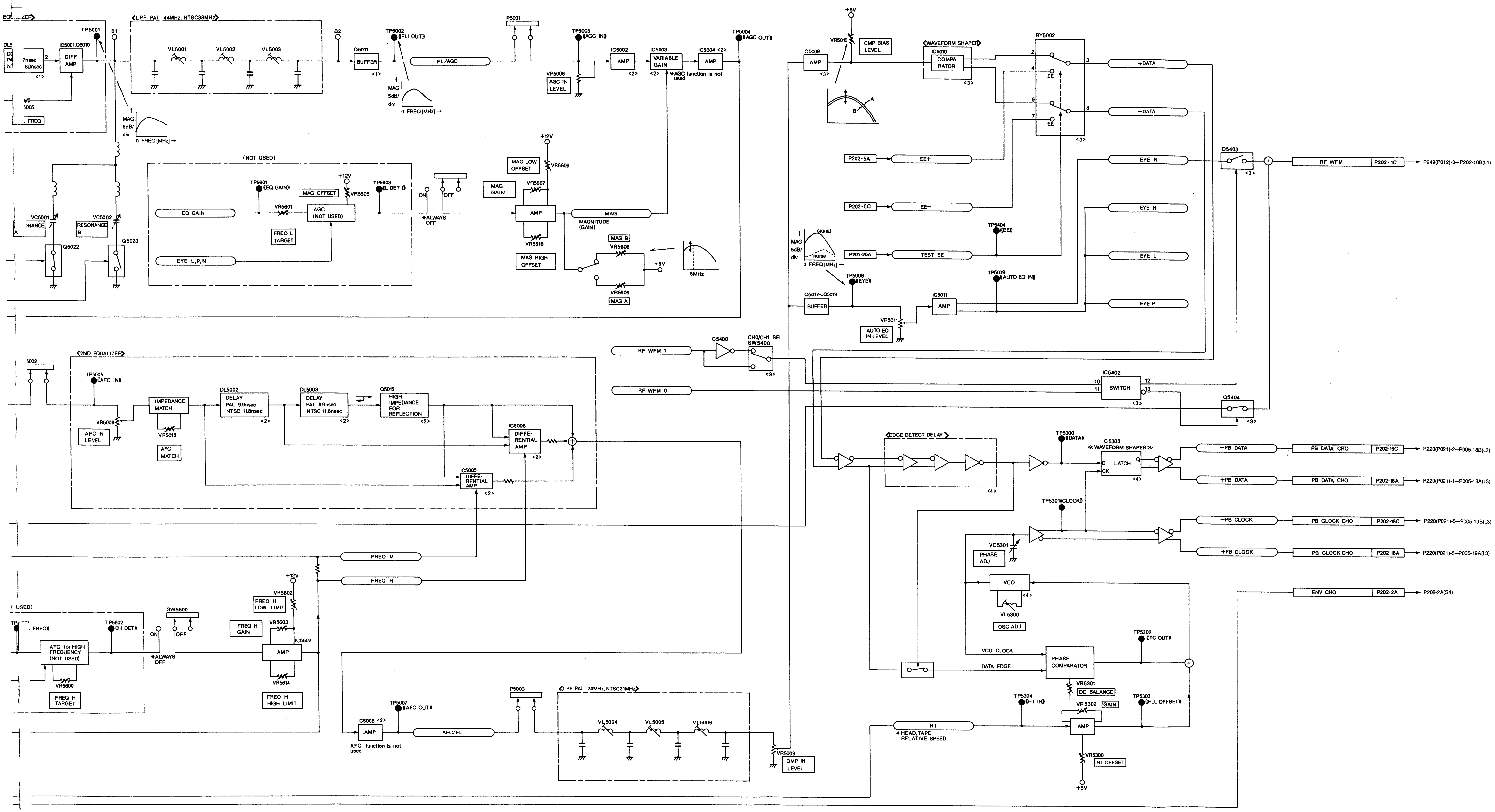






S1, S2 EQUALIZER CH0 (CH1) BLOCK DIAGARAM

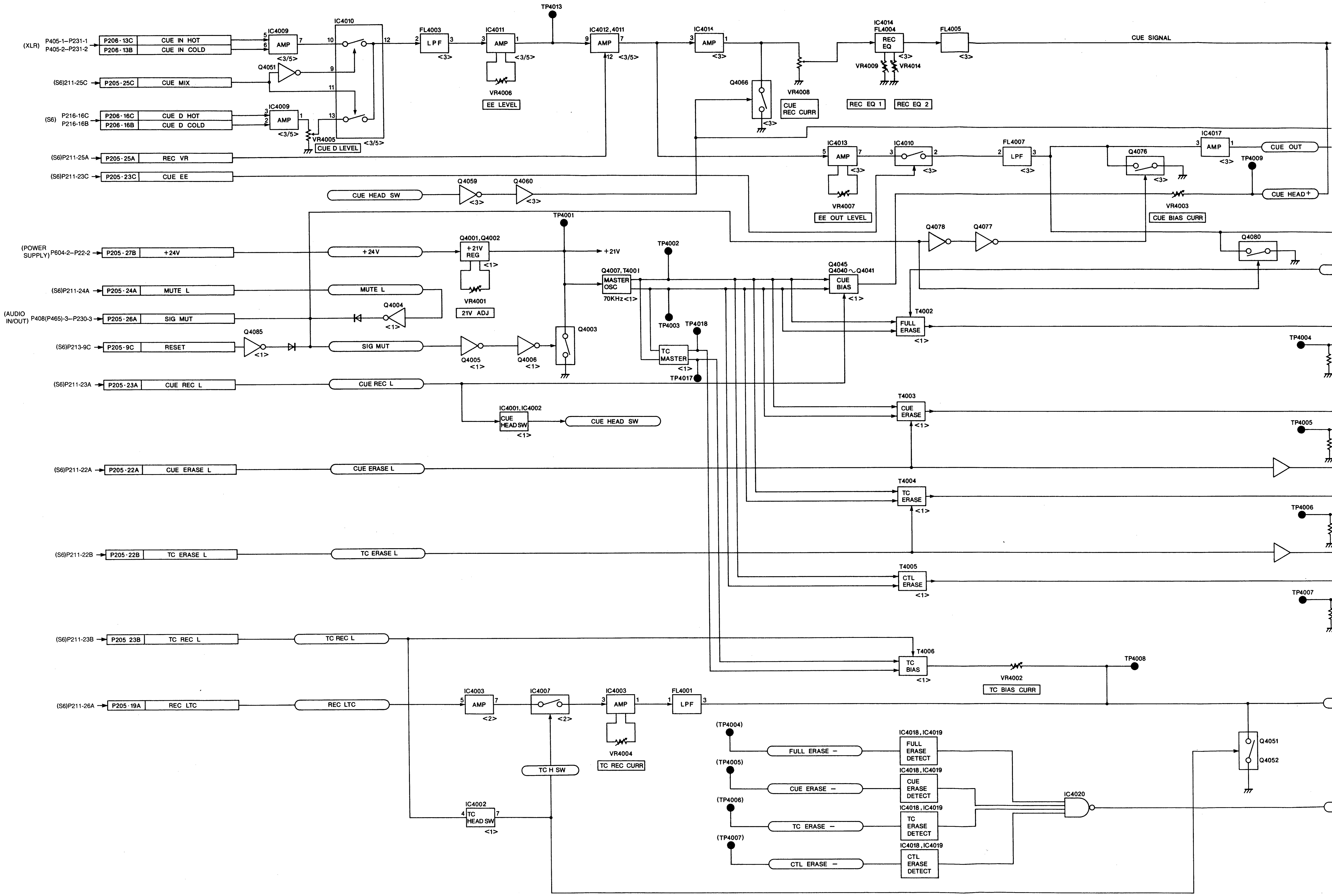


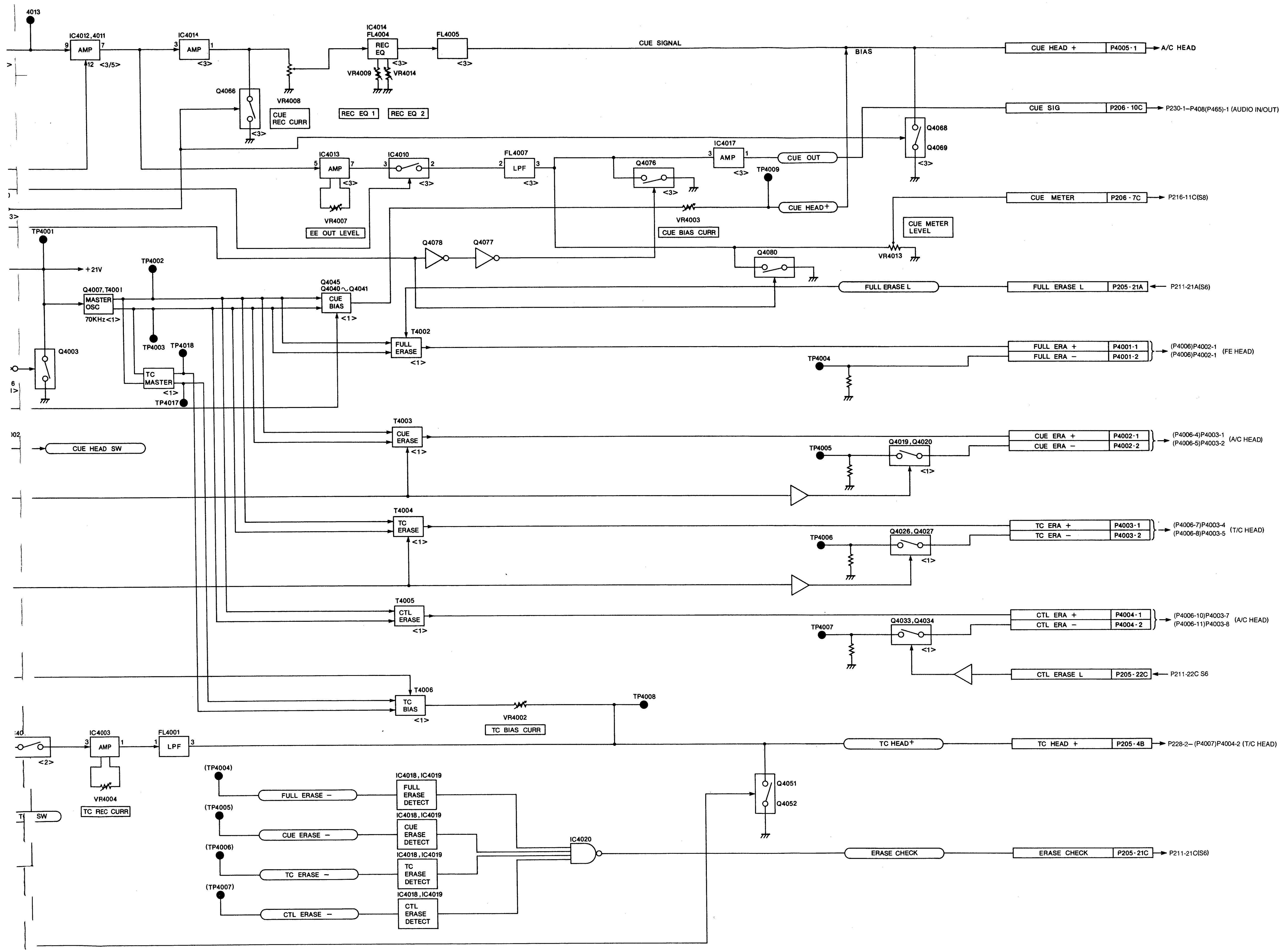


REVERSE SIDE

S3 CUE AUDIO REC

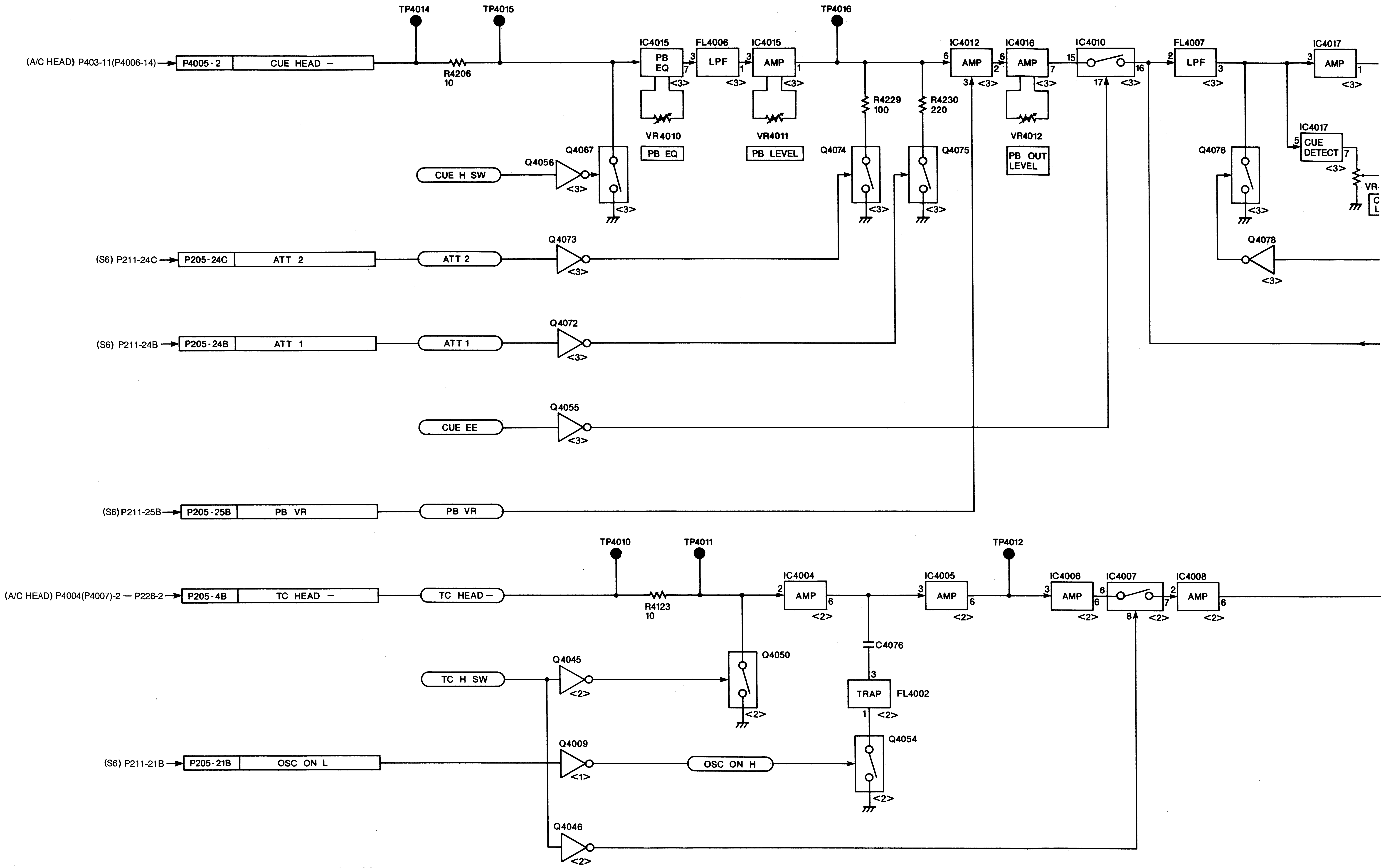
S3 CUE AUDIO REC BLOCK DIAGRAM

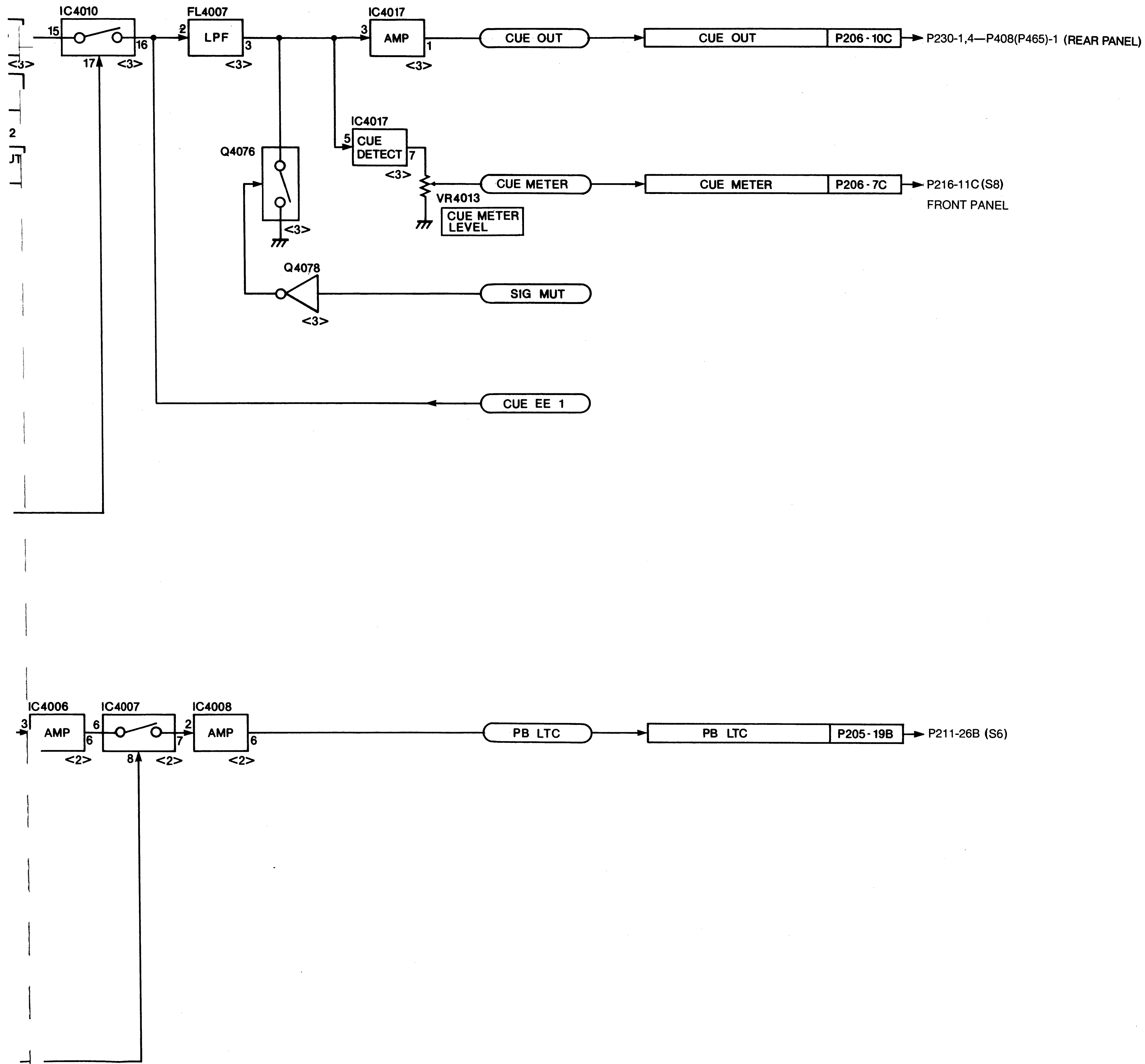




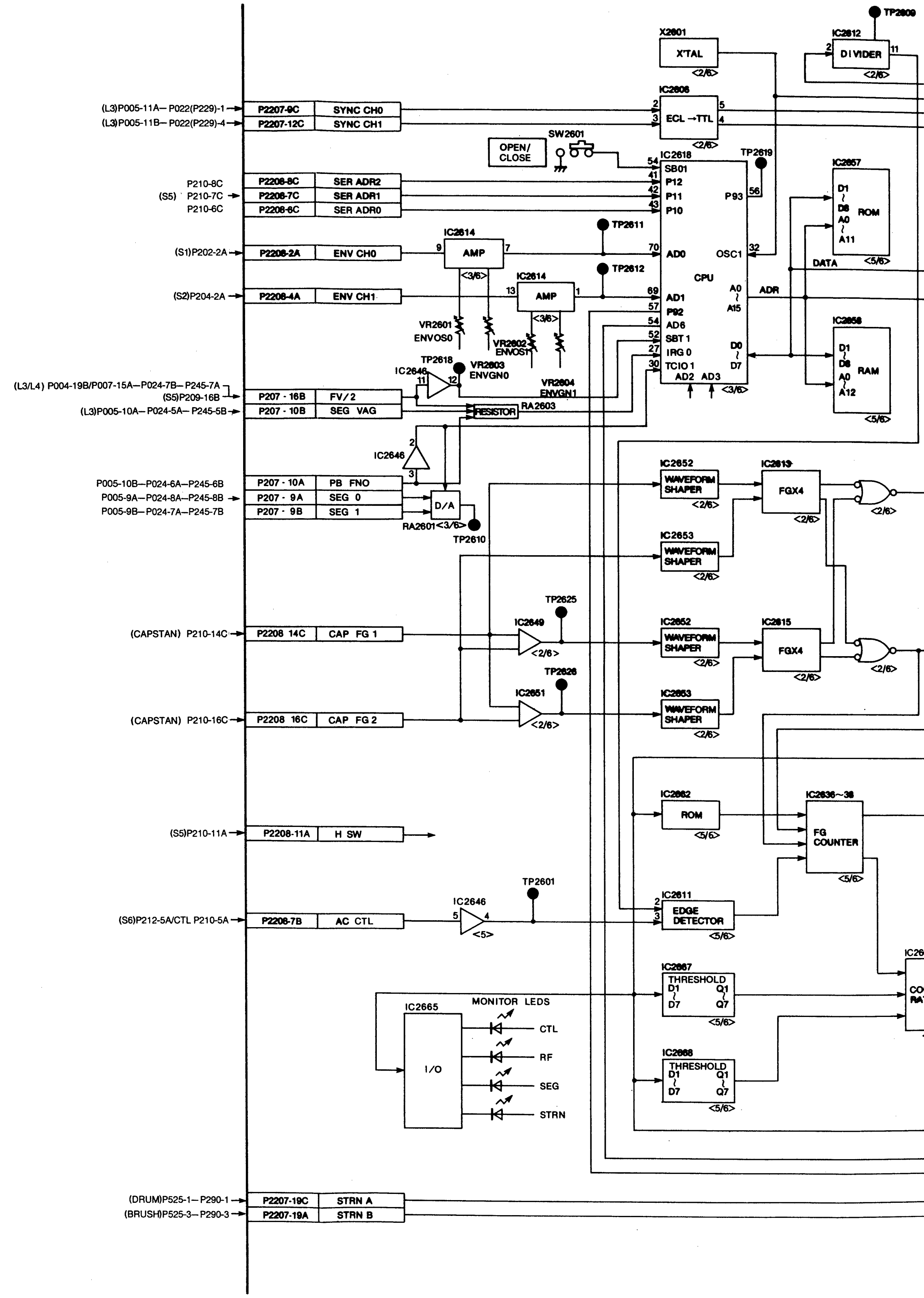
IC4012, 4011
AMP
IC4014
AMP
IC4014
FL4004
REC EQ
FL4005
CUE SIGNAL
BIAS
CUE HEAD +
P4005-1
A/C HEAD
VR4008
CUE REC CURR
VR4009
VR4014
REC EQ 1
REC EQ 2
Q4066
CUE SIG
P206-10C
P230-1—P408(P465)-1 (AUDIO IN/OUT)
Q4068
Q4069
IC4013
IC4010
FL4007
LPF
IC4017
Q4076
CUE OUT
TP4009
CUE HEAD+
CUE METER
P206-7C
P216-11C(S8)
VR4007
EE OUT LEVEL
VR4003
CUE BIAS CURR
CUE METER LEVEL
VR4013
TP4001
+21V
TP4002
Q4078
Q4077
Q4080
FULL ERASE L
P205-21A
P211-21A(S6)
Q4007, T4001
MASTER OSC
70KHz
Q4045
Q4040～Q4041
CUE BIAS
T4002
FULL ERASE
TP4003
TP4018
Q4003
TC MASTER
TP4017
FULL ERA +
FULL ERA −
P4001-1
P4001-2
(P4006)P4002-1
(P4006)P4002-1
(FE HEAD)
TP4004
T4003
CUE ERASE
CUE HEAD SW
CUE ERA +
CUE ERA −
P4002-1
P4002-2
(P4006-4)P4003-1
(P4006-5)P4003-2
(A/C HEAD)
TP4005
Q4019, Q4020
T4004
TC ERASE
TC ERA +
TC ERA −
P4003-1
P4003-2
(P4006-7)P4003-4
(P4006-8)P4003-5
(T/C HEAD)
TP4006
Q4026, Q4027
T4005
CTL ERASE
CTL ERA +
CTL ERA −
P4004-1
P4004-2
(P4006-10)P4003-7
(P4006-11)P4003-8
(A/C HEAD)
TP4007
Q4033, Q4034
CTL ERASE L
P205-22C
P211-22C S6
T4006
TC BIAS
VR4002
TC BIAS CURR
TP4008
IC4003
AMP
FL4001
LPF
TC HEAD+
TC HEAD +
P205-4B
P228-2—(P4007)P4004-2 (T/C HEAD)
VR4004
TC REC CURR
Q4051
Q4052
(TP4004)
FULL ERASE −
IC4018, IC4019
FULL ERASE DETECT
(TP4005)
CUE ERASE −
CUE ERASE DETECT
(TP4006)
TC ERASE −
TC ERASE DETECT
(TP4007)
CTL ERASE −
CTL ERASE DETECT
IC4020
ERASE CHECK
P205-21C
P211-21C(S6)

S3 CUE AUDIO PLAYBACK BLOCK DIAGRAM





S4 AUTO TRACKING BLOCK DIAGRAM

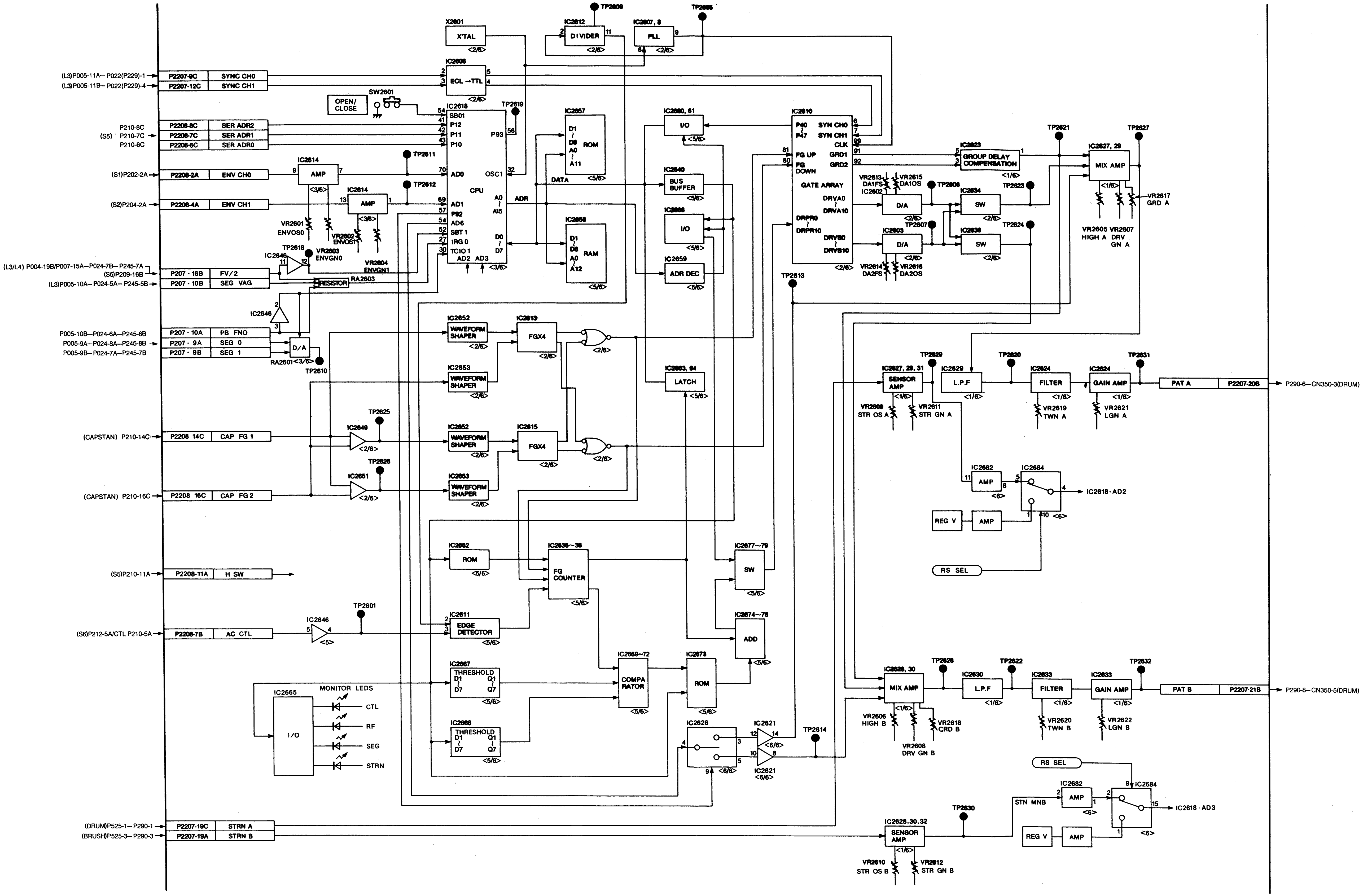


S4 AUTO TRACKING BLOCK DIAGRAM

→ P230-1,4—P408(P465)-1 (REAR PANEL)

→ P216-11C (S8)
FRONT PANEL

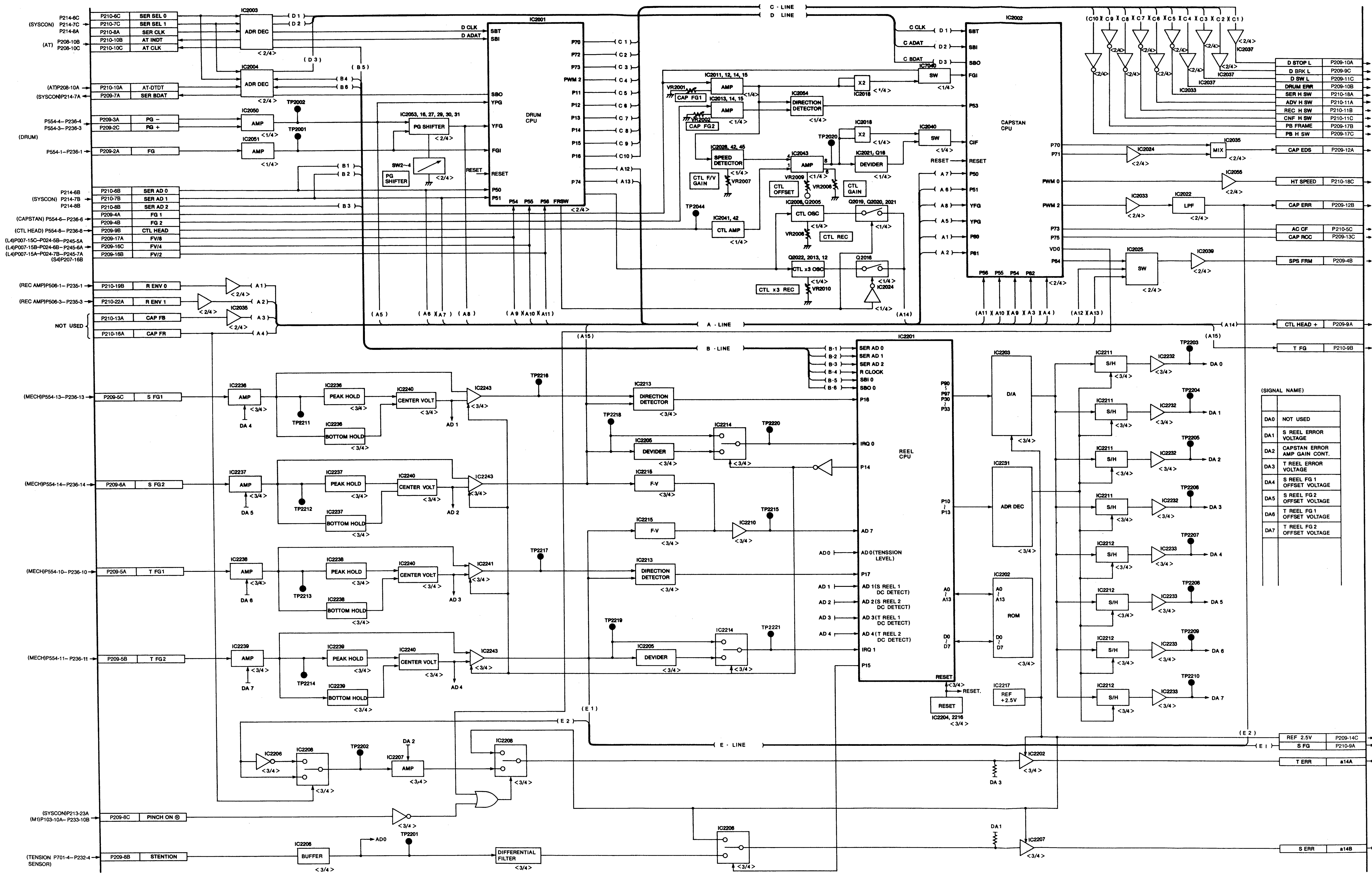
→ P211-26B (S6)

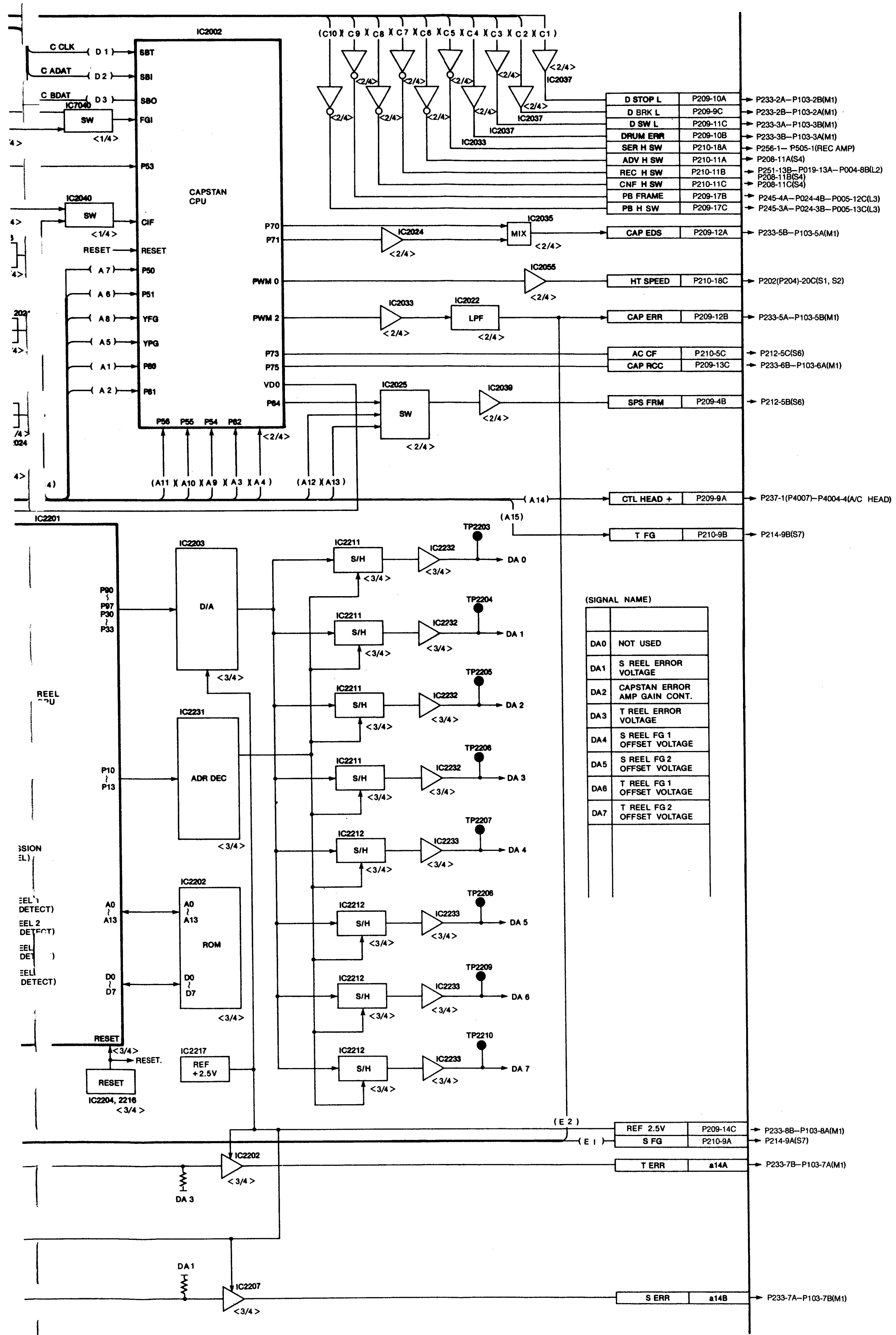


REVERSE SIDE

S5 SERVO/S6 TIME CODE

S5 SERVO BLOCK DIAGRAM

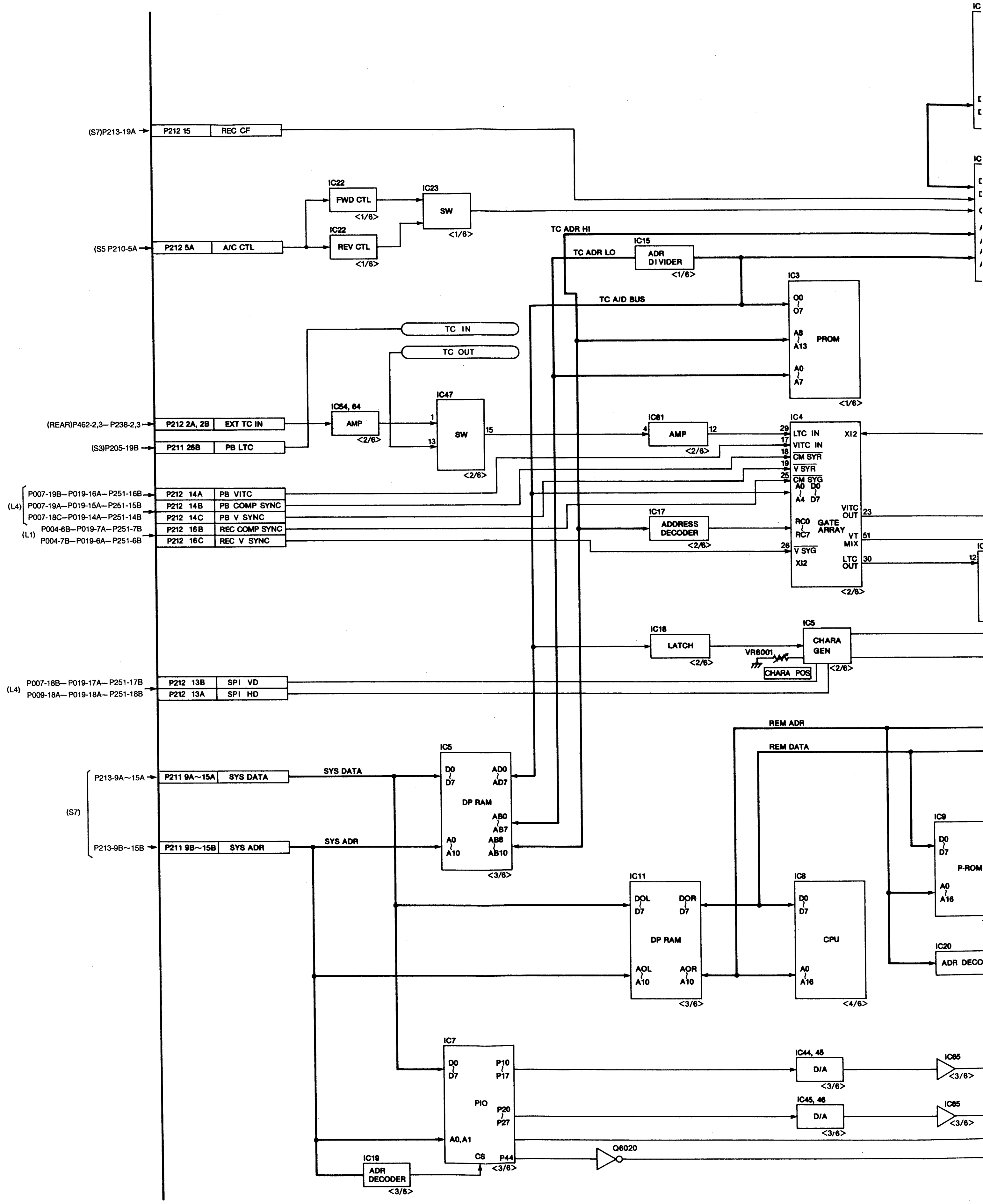




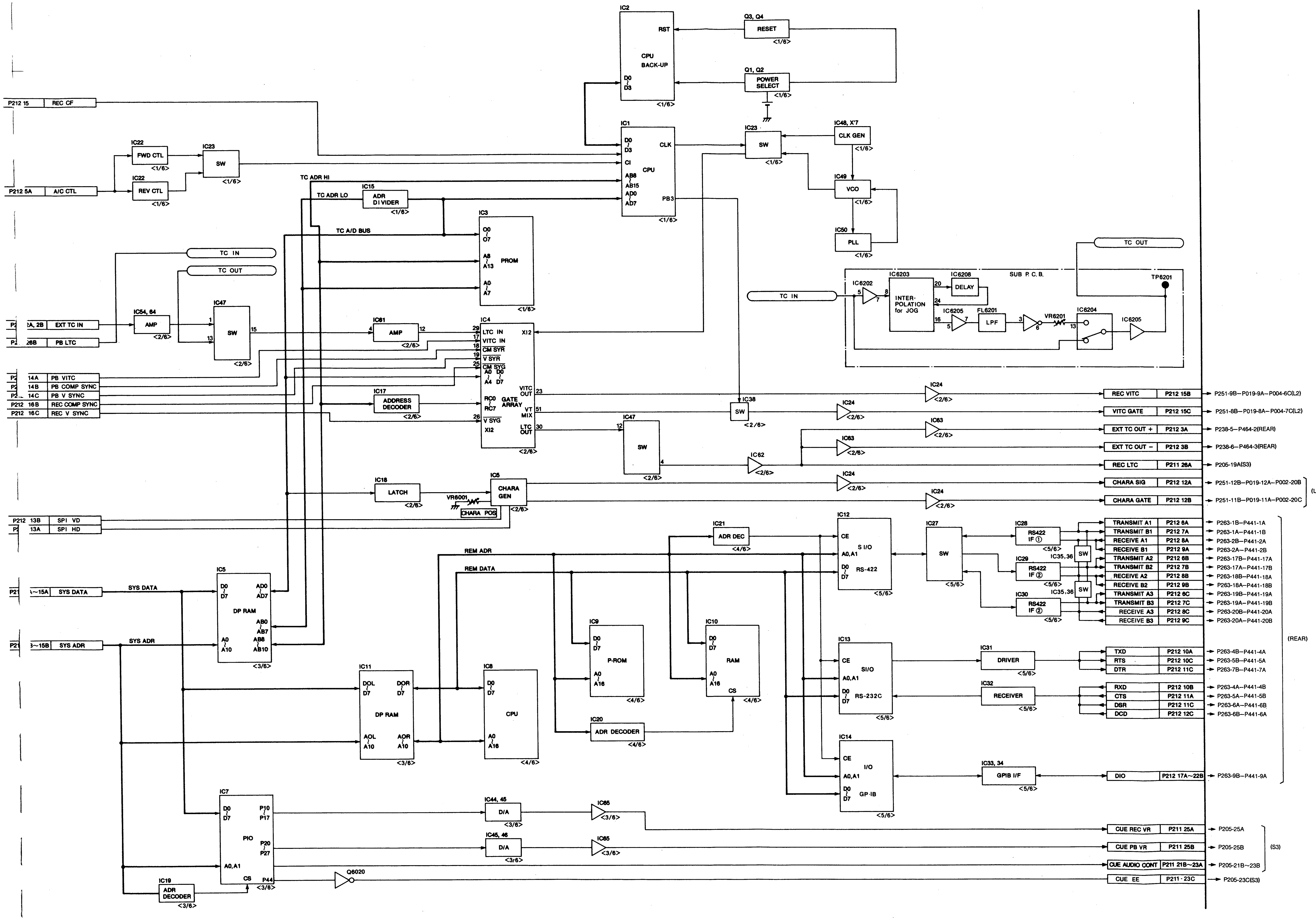
(SIGNAL NAME)

DA0	NOT USED
DA1	S REEL ERROR VOLTAGE
DA2	CAPSTAN ERROR AMP GAIN CONT.
DA3	T REEL ERROR VOLTAGE
DA4	S REEL FG 1 OFFSET VOLTAGE
DA5	S REEL FG 2 OFFSET VOLTAGE
DA6	T REEL FG 1 OFFSET VOLTAGE
DA7	T REEL FG 2 OFFSET VOLTAGE

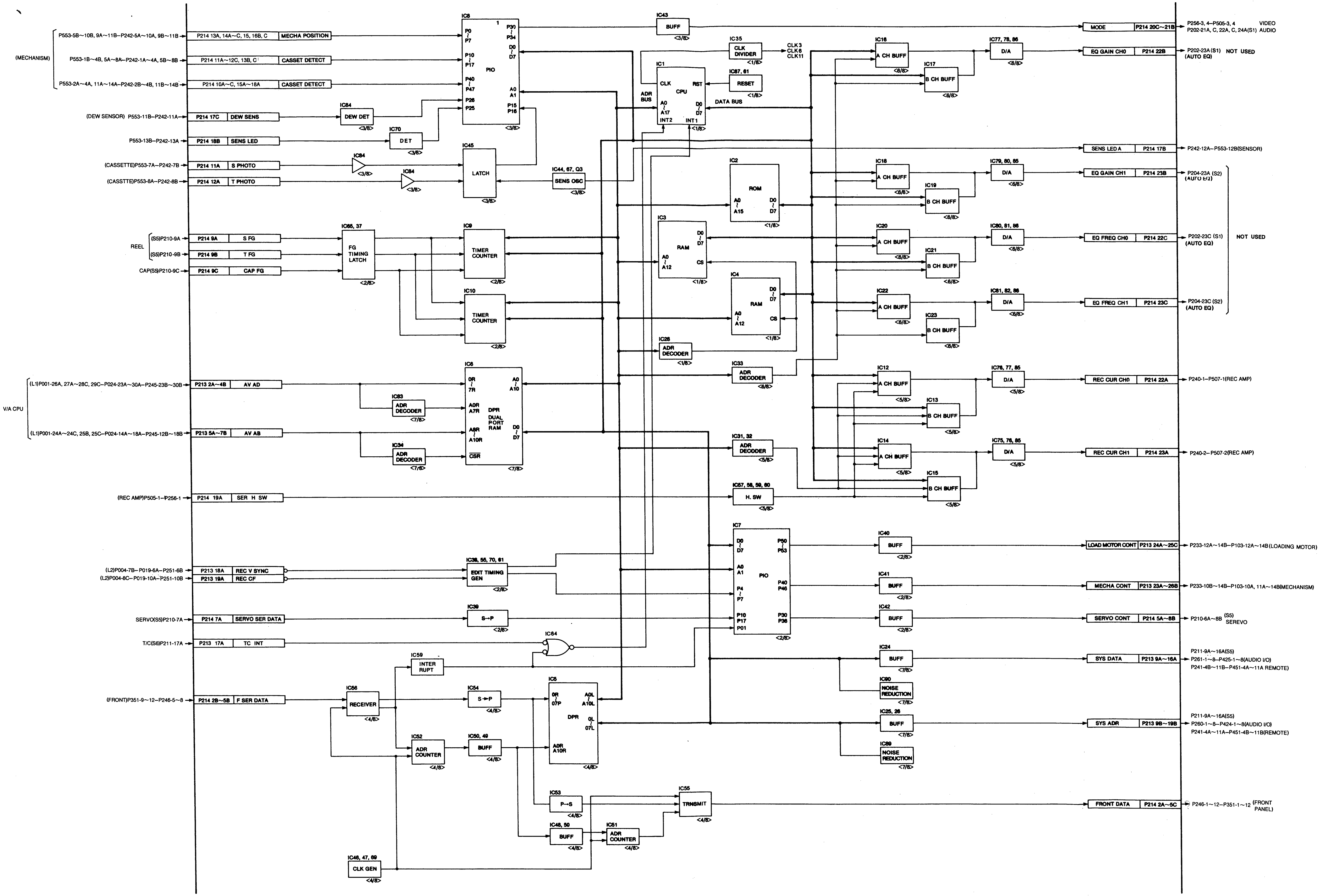
S6 TIME CODE BLOCK DIAGRAM



DE BLOCK DIAGRAM

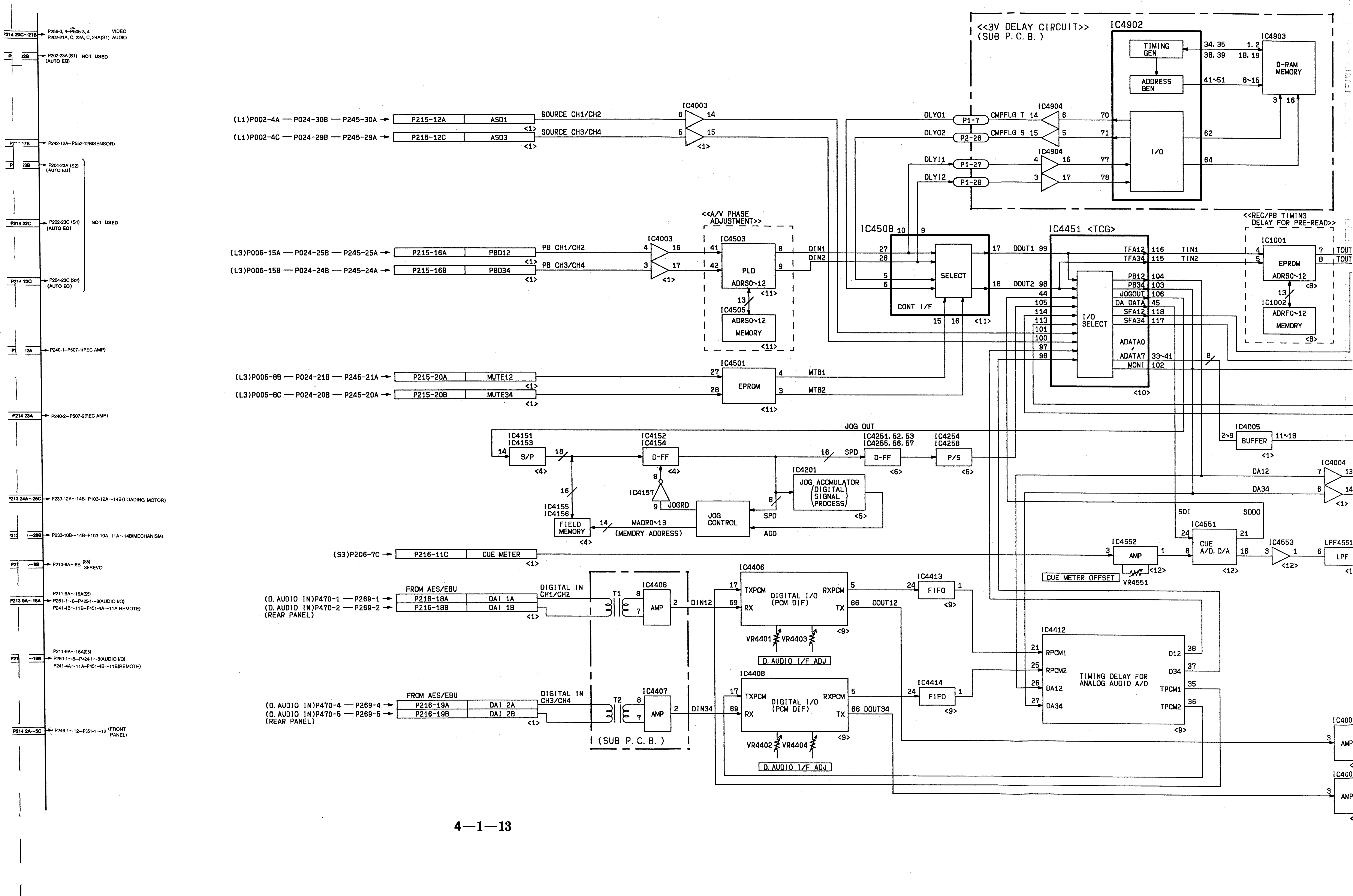


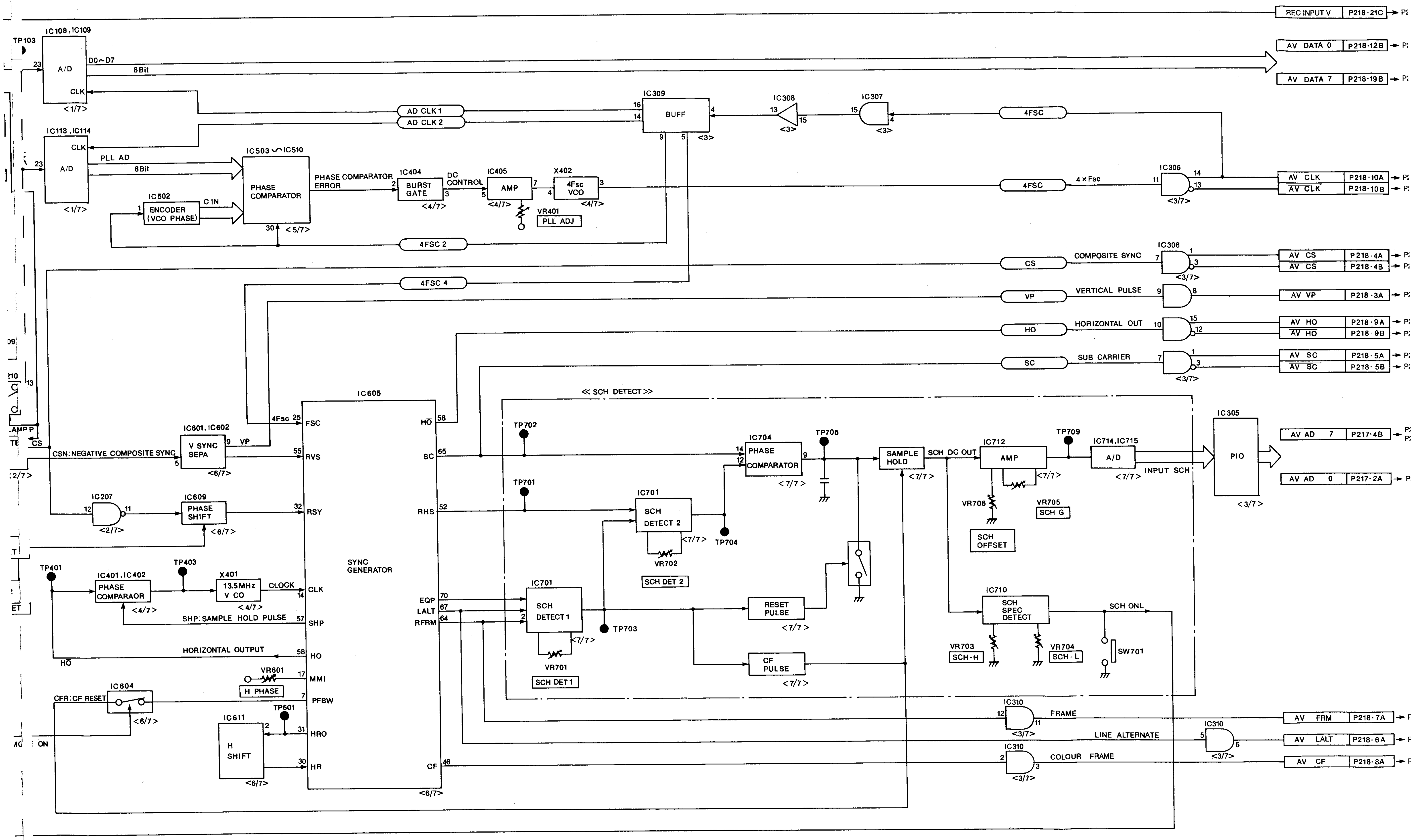
S7 SYSTEM CONTROL BLOCK DIAGRAM



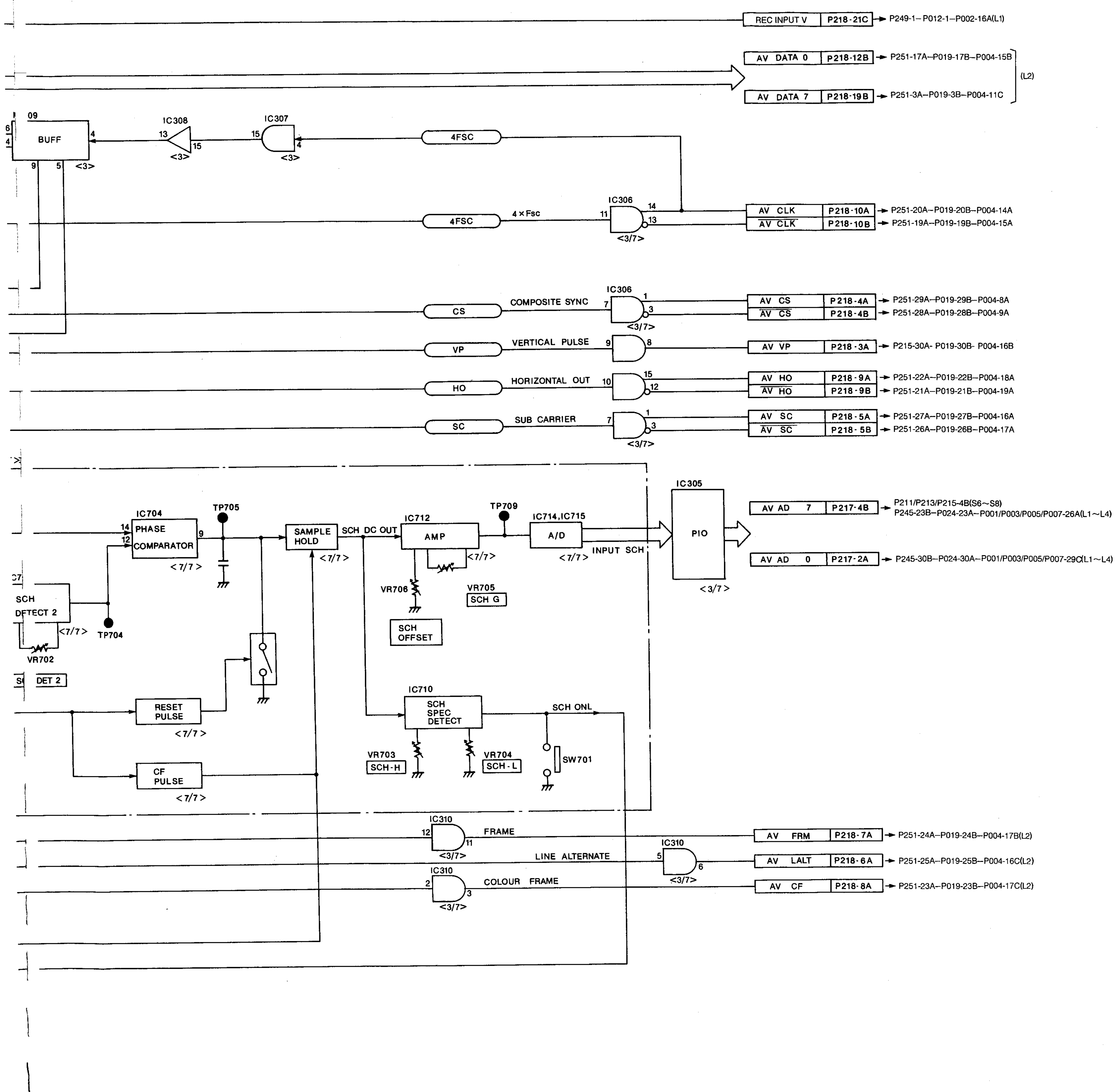
S8 AU

S8 AUDIO PROCESS BLOCK DIAGRAM

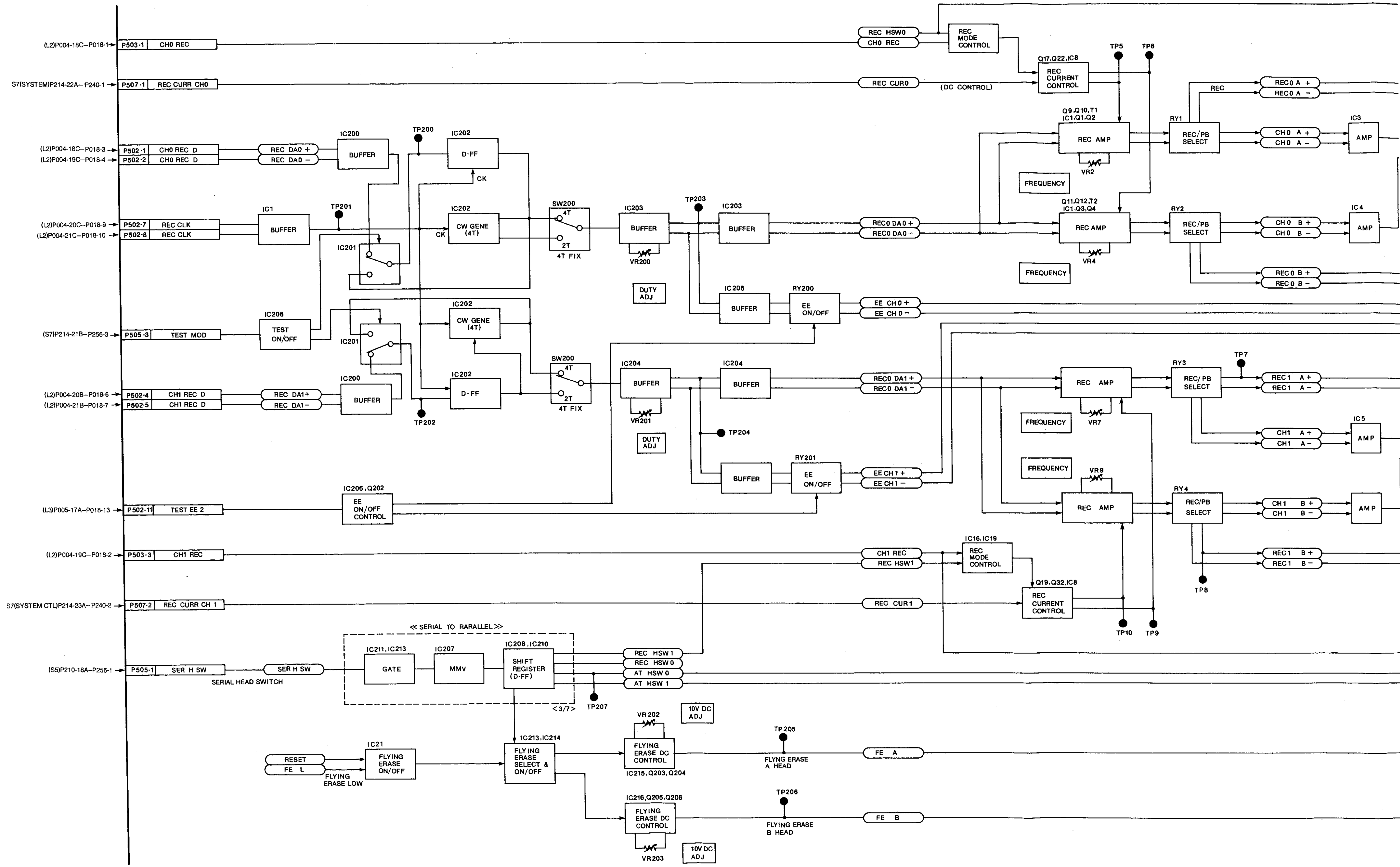


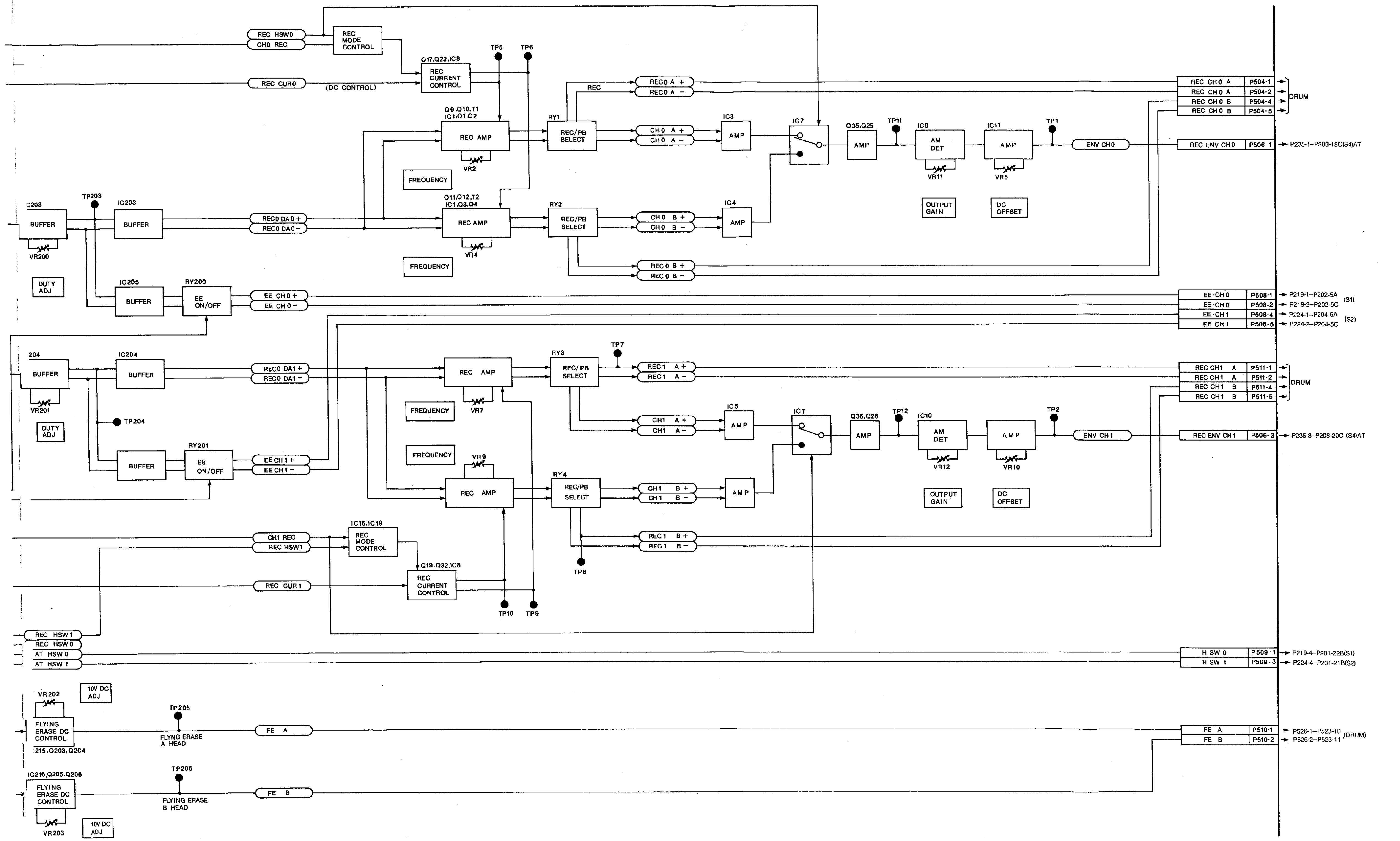


REC INPUT V
P218-21C
AV DATA 0
P218-12B
AV DATA 7
P218-19B
IC108, IC109
TP103
A/D
D0~D7
8Bit
CLK
<1/7>
IC113, IC114
A/D
CLK
PLL AD
8Bit
<1/7>
IC309
BUFF
<3>
IC308
IC307
4FSC
AD CLK 1
AD CLK 2
IC503 ~ IC510
PHASE COMPARATOR
<5/7>
IC502
ENCODER (VCO PHASE)
C IN
PHASE COMPARATOR ERROR
IC404
BURST GATE
<4/7>
DC CONTROL
IC405
AMP
<4/7>
X402
4Fsc VCO
<4/7>
VR401
PLL ADJ
4FSC 2
4FSC
4×Fsc
IC306
<3/7>
AV CLK
P218-10A
AV CLK
P218-10B
CS
COMPOSITE SYNC
AV CS
P218-4A
AV CS
P218-4B
4FSC 4
VP
VERTICAL PULSE
AV VP
P218-3A
HO
HORIZONTAL OUT
AV HO
P218-9A
AV HO
P218-9B
SC
SUB CARRIER
AV SC
P218-5A
AV SC
P218-5B
≪ SCH DETECT ≫
IC605
SYNC GENERATOR
FSC
RVS
RSY
CLK
SHP
HO
MMI
PFBW
HRO
HR
CF
RHS
EQP
LALT
RFRM
<6/7>
IC601, IC602
V SYNC SEPA
<6/7>
CSN: NEGATIVE COMPOSITE SYNC
IC207
<2/7>
IC609
PHASE SHIFT
<6/7>
TP401
TP403
IC401, IC402
PHASE COMPARAOR
<4/7>
X401
13.5MHz V CO
CLOCK
SHP: SAMPLE HOLD PULSE
HORIZONTAL OUTPUT
VR601
H PHASE
IC604
CFR: CF RESET
<6/7>
IC611
H SHIFT
<6/7>
TP601
TP702
TP701
TP705
IC704
PHASE COMPARATOR
<7/7>
IC701
SCH DETECT 2
<7/7>
TP704
VR702
SCH DET 2
IC701
SCH DETECT 1
<7/7>
VR701
SCH DET 1
TP703
RESET PULSE
<7/7>
CF PULSE
<7/7>
SAMPLE HOLD
<7/7>
SCH DC OUT
IC712
AMP
<7/7>
VR706
SCH OFFSET
VR705
SCH G
TP709
IC714, IC715
A/D
<7/7>
INPUT SCH
IC710
SCH SPEC DETECT
VR703
SCH-H
VR704
SCH-L
SCH ONL
SW701
IC305
PIO
<3/7>
AV AD 7
P217-4B
AV AD 0
P217-2A
IC310
FRAME
<3/7>
AV FRM
P218-7A
LINE ALTERNATE
AV LALT
P218-6A
COLOUR FRAME
AV CF
P218-8A


REC INPUT V
P218-21C
P249-1–P012-1–P002-16A(L1)
AV DATA 0
P218-12B
P251-17A–P019-17B–P004-15B
(L2)
AV DATA 7
P218-19B
P251-3A–P019-3B–P004-11C
BUFF
IC308
IC307
4FSC
IC306
4×Fsc
AV CLK
P218-10A
P251-20A–P019-20B–P004-14A
P218-10B
P251-19A–P019-19B–P004-15A
CS
COMPOSITE SYNC
AV CS
P218-4A
P251-29A–P019-29B–P004-8A
P218-4B
P251-28A–P019-28B–P004-9A
VP
VERTICAL PULSE
AV VP
P218-3A
P215-30A- P019-30B- P004-16B
HO
HORIZONTAL OUT
AV HO
P218-9A
P251-22A–P019-22B–P004-18A
P218-9B
P251-21A–P019-21B–P004-19A
SC
SUB CARRIER
AV SC
P218-5A
P251-27A–P019-27B–P004-16A
P218-5B
P251-26A–P019-26B–P004-17A
IC305
PIO
AV AD 7
P217-4B
P211/P213/P215-4B(S6~S8)
P245-23B–P024-23A–P001/P003/P005/P007-26A(L1~L4)
AV AD 0
P217-2A
P245-30B–P024-30A–P001/P003/P005/P007-29C(L1~L4)
IC704
PHASE
COMPARATOR
TP705
SAMPLE
HOLD
SCH DC OUT
IC712
AMP
TP709
IC714,IC715
A/D
INPUT SCH
VR706
VR705
SCH G
SCH
OFFSET
SCH
DETECT 2
TP704
VR702
DET 2
RESET
PULSE
IC710
SCH
SPEC
DETECT
SCH ONL
VR703
SCH-H
VR704
SCH-L
SW701
CF
PULSE
IC310
FRAME
AV FRM
P218-7A
P251-24A–P019-24B–P004-17B(L2)
LINE ALTERNATE
AV LALT
P218-6A
P251-25A–P019-25B–P004-16C(L2)
COLOUR FRAME
AV CF
P218-8A
P251-23A–P019-23B–P004-17C(L2)

REC AMPLIFIER BLOCK DIAGRAM

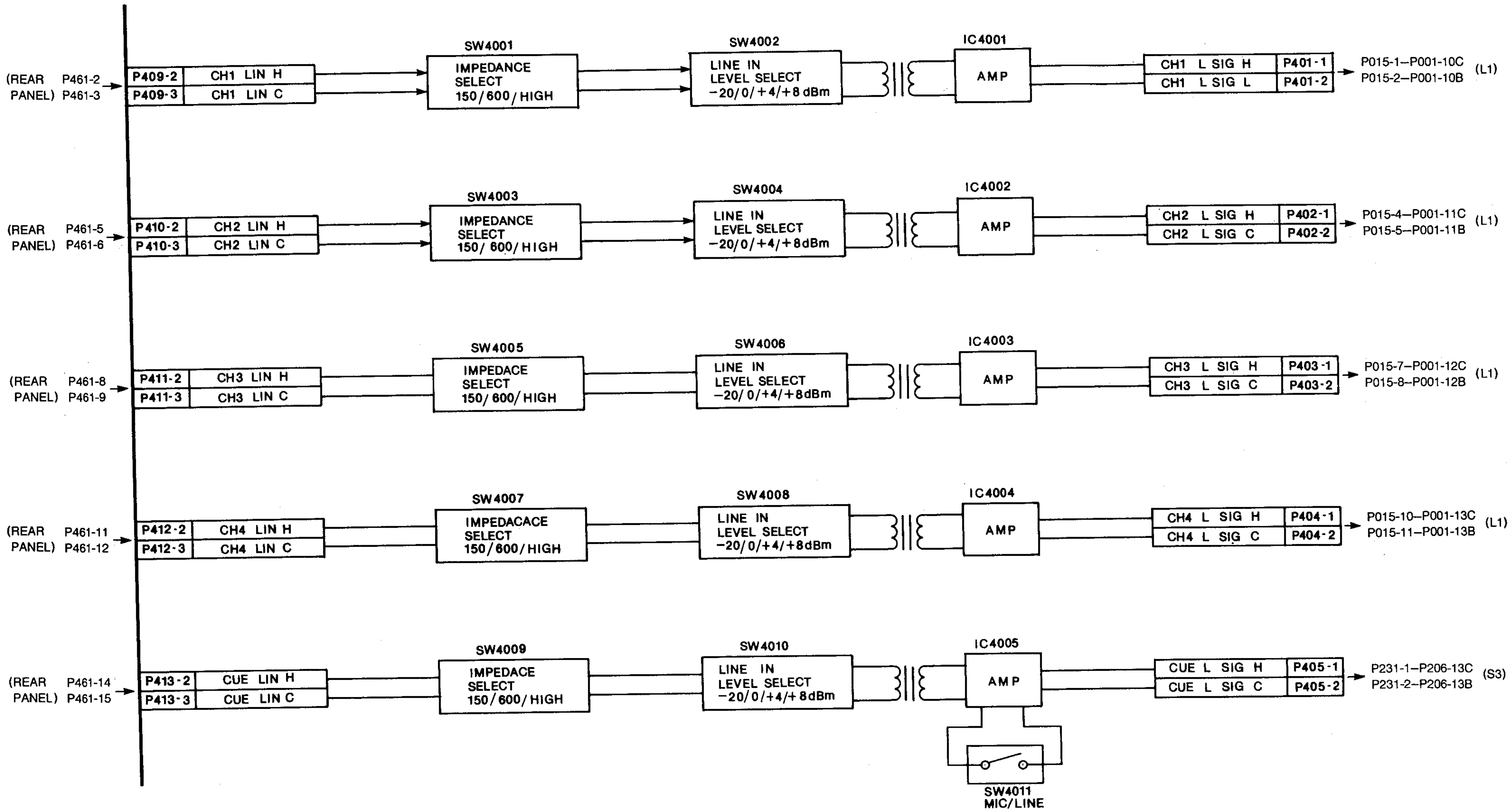




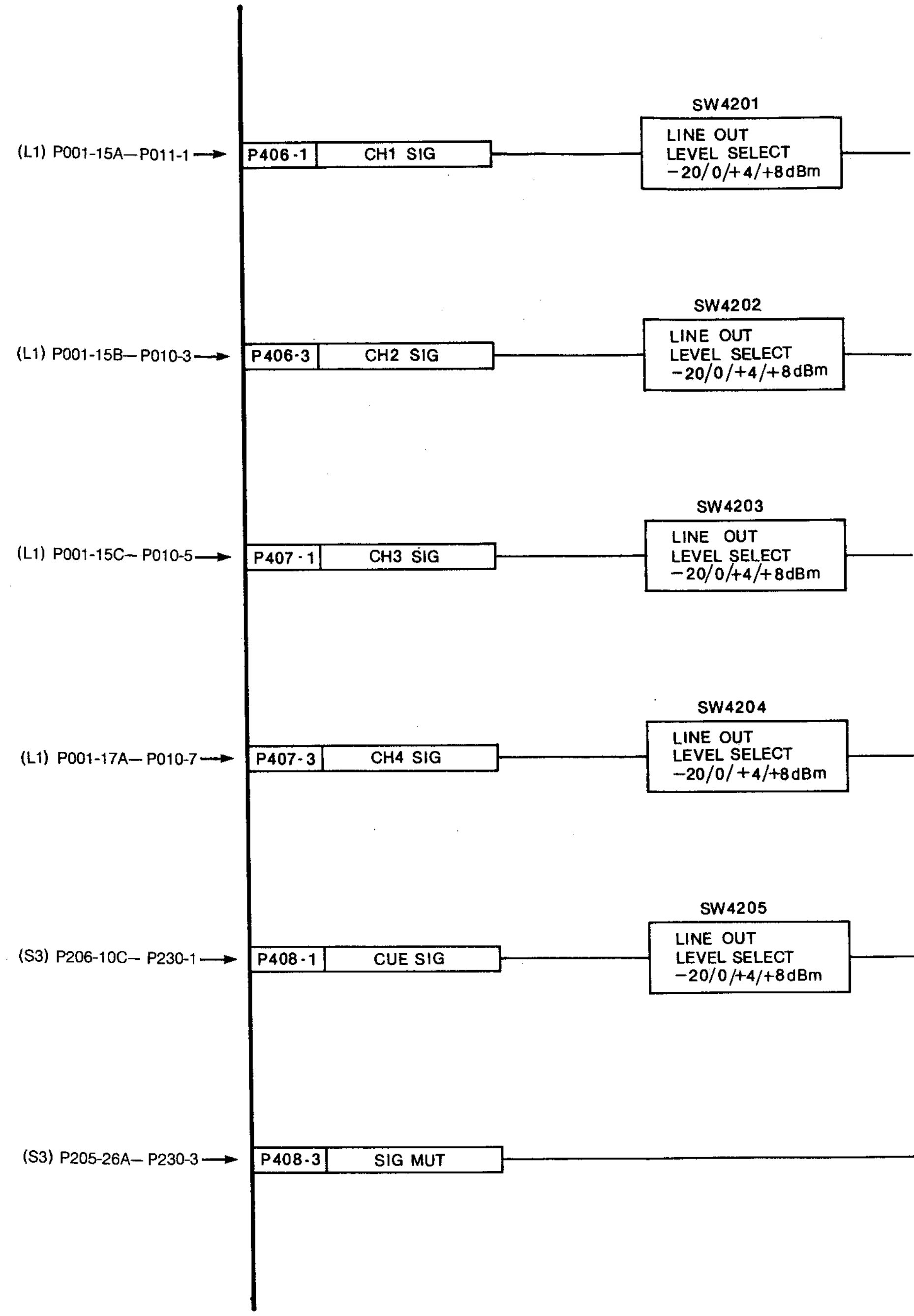
REVERSE SIDE

AUDIO IN/AUDIO OUT

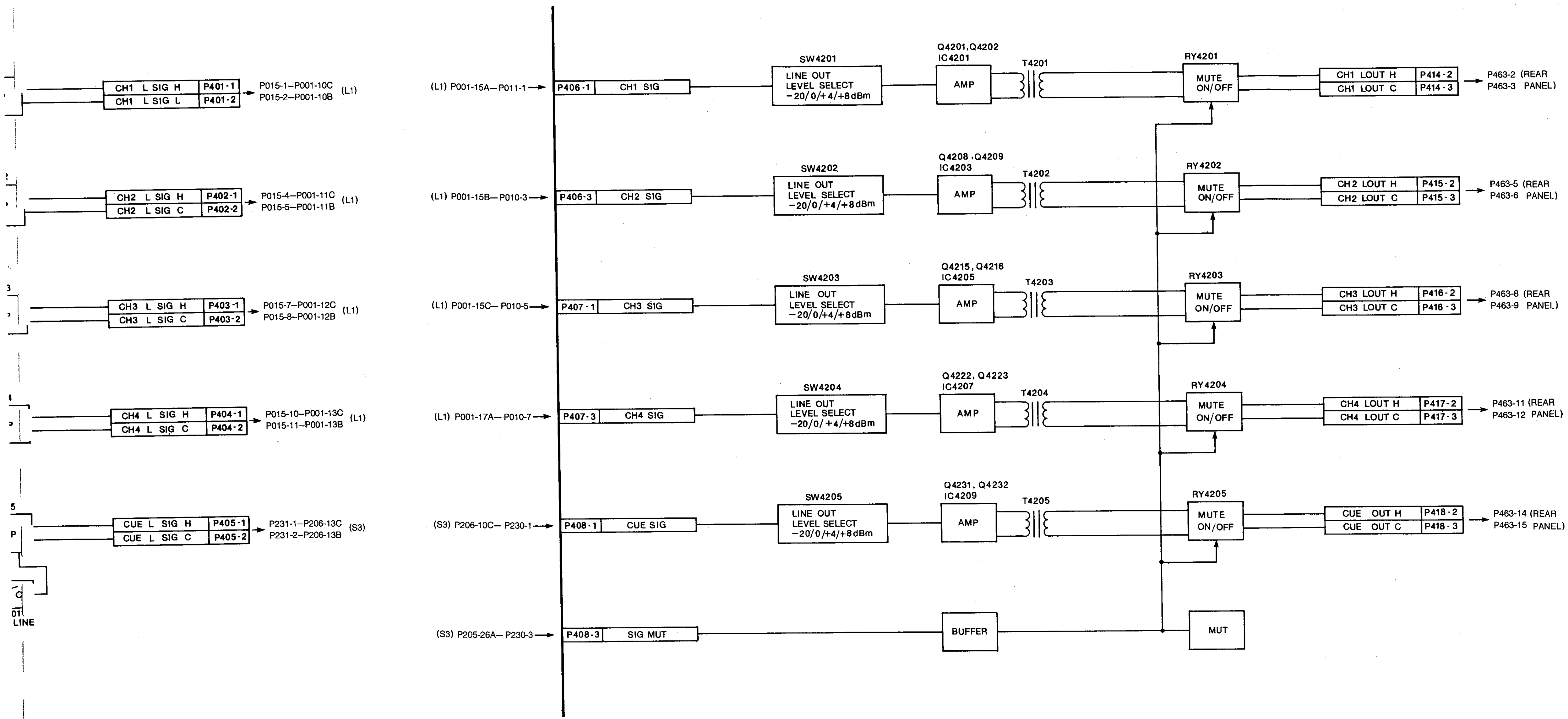
AUDIO IN BLOCK DIAGRAM



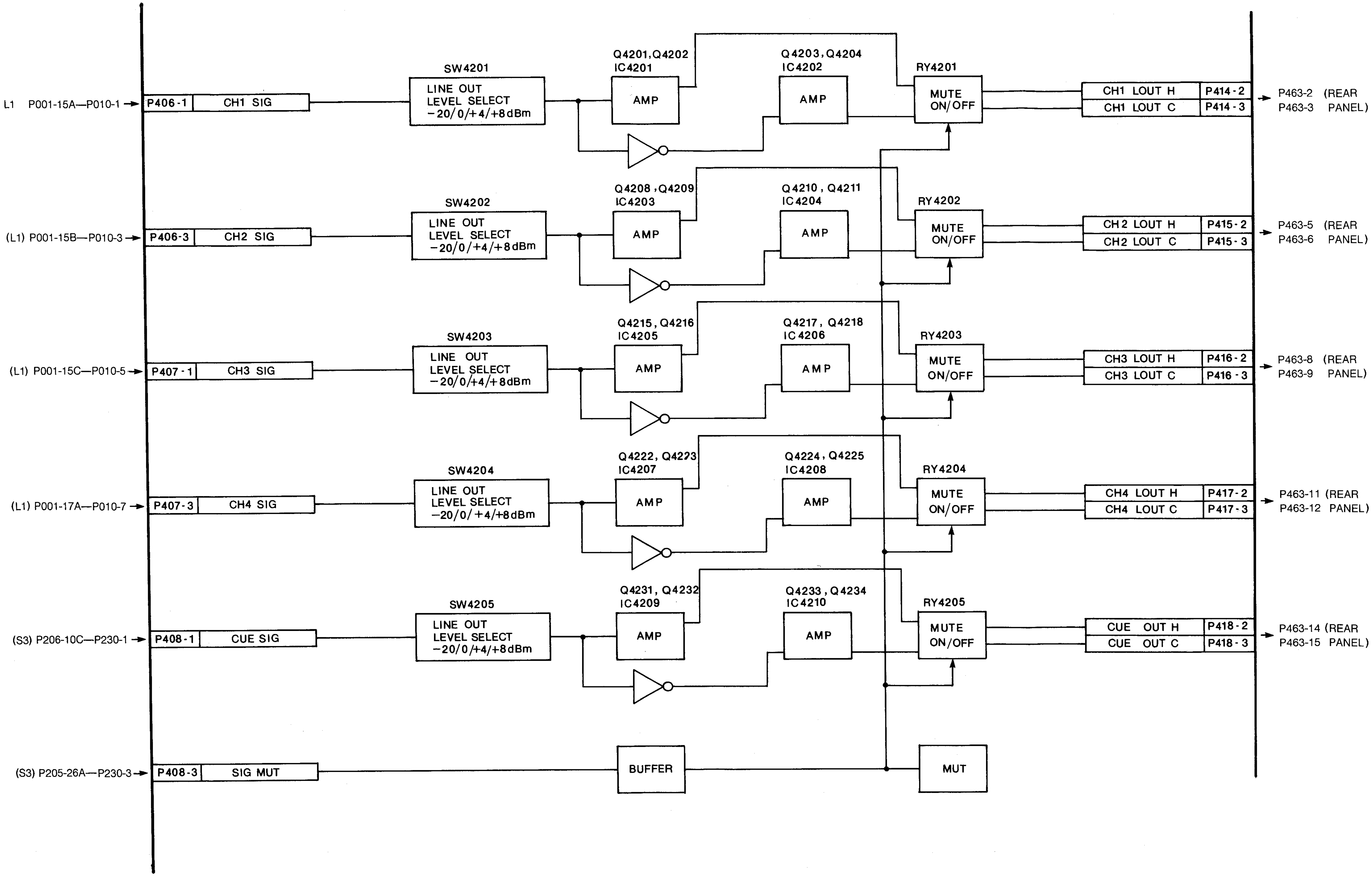
AUDIO OUT BLOCK DIAGRAM [FOR PAL]



AUDIO OUT BLOCK DIAGRAM [FOR PAL]

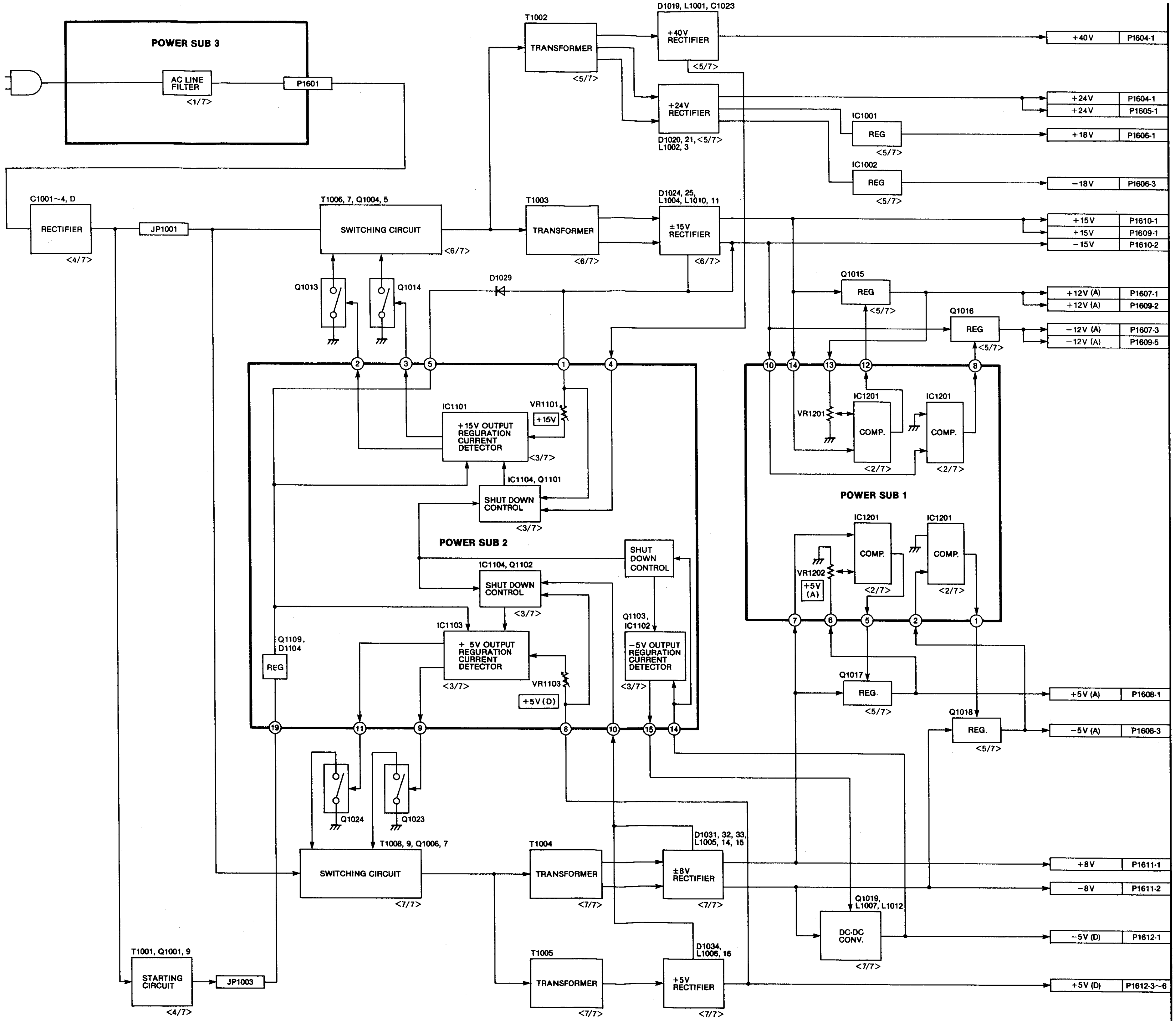


AUDIO OUT BLOCK DIAGRAM [FOR NTSC]



4—1—17

POWER SUPPLY BLOCK DIAGRAM

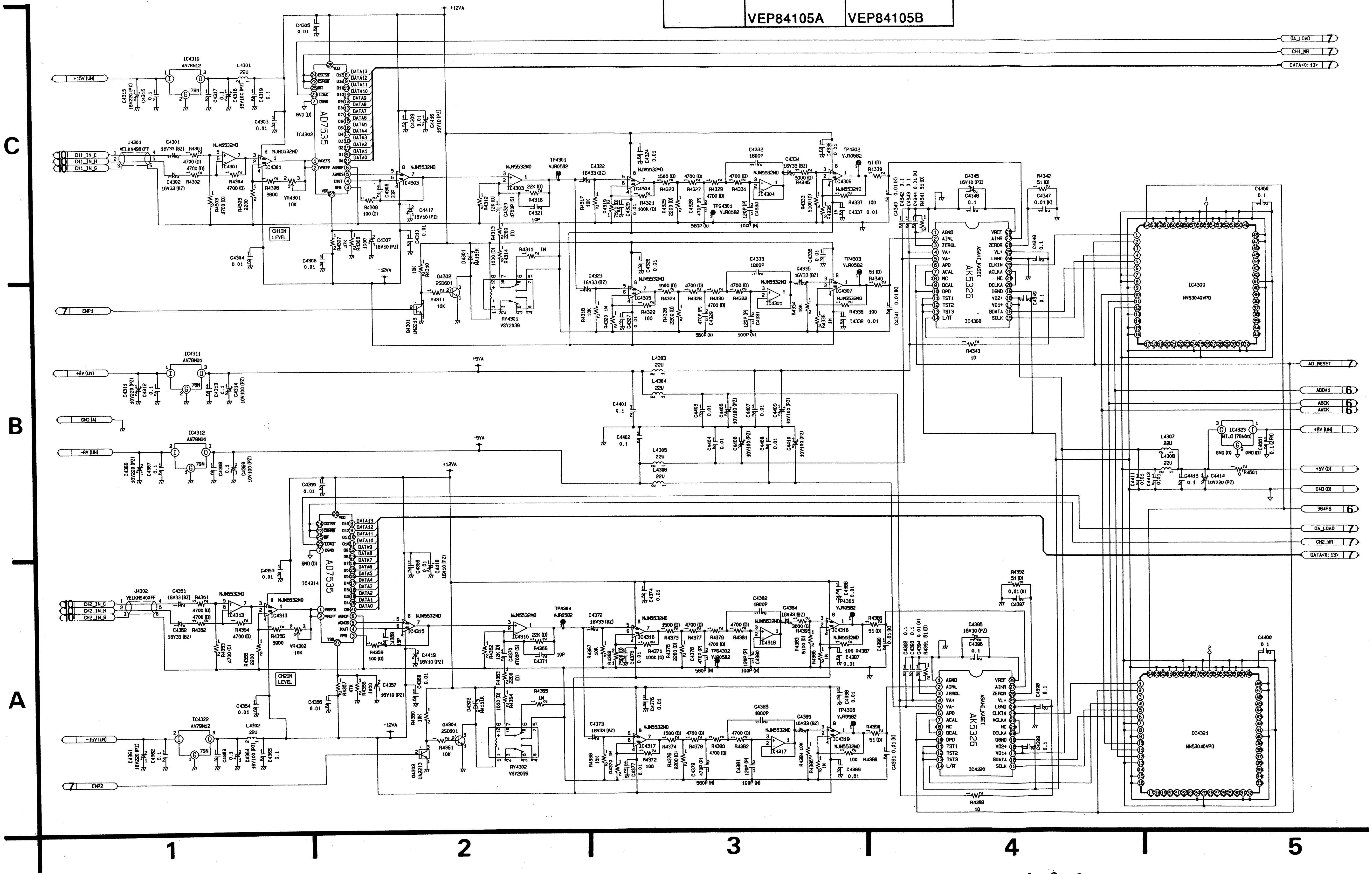


REVERSE SIDE
AUDIO OUT

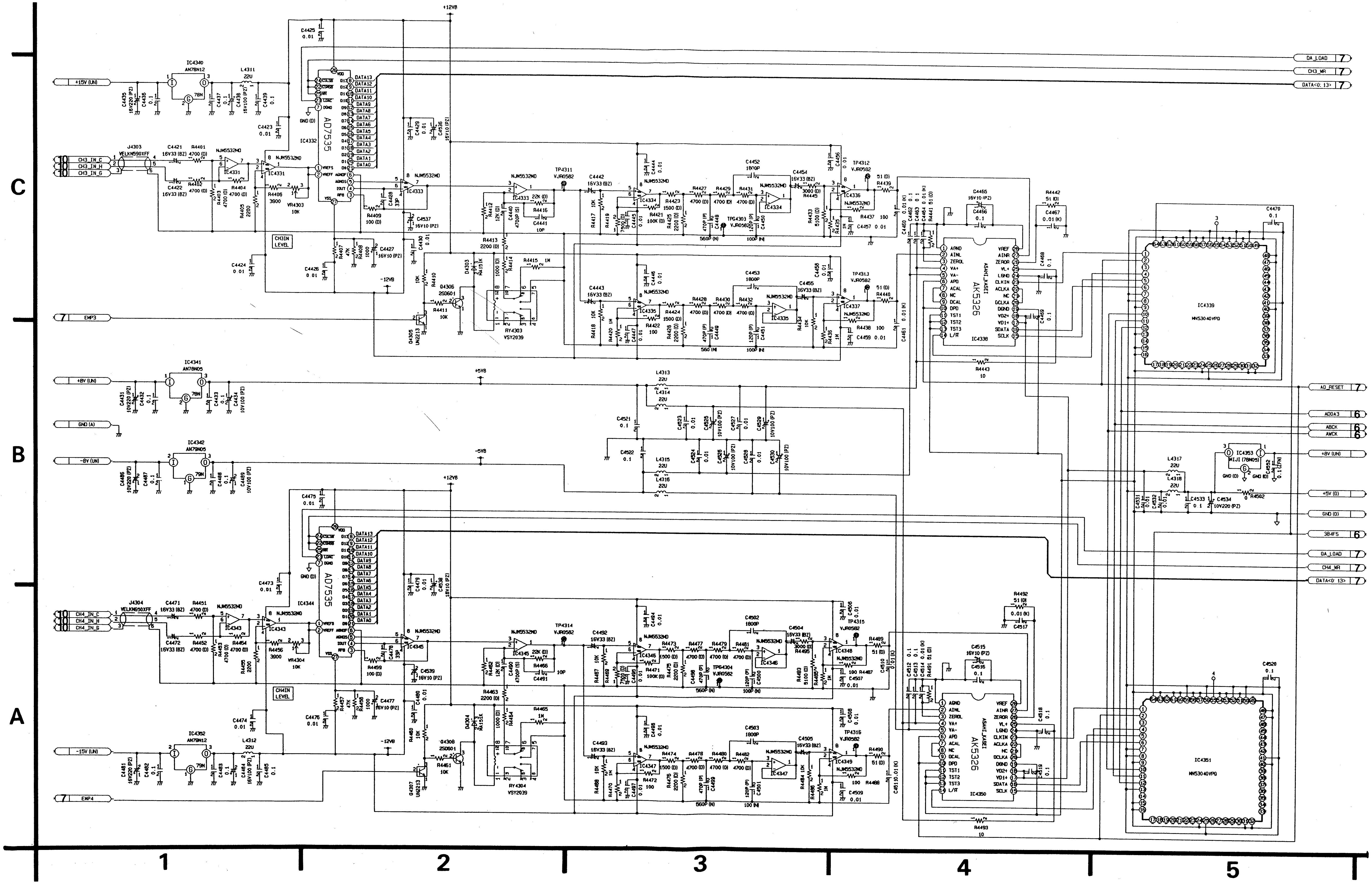
L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (1/10)

COMPARISON CHART BETWEEN
NTSC MODEL AND PAL MODEL
L1 AUDIO A/D D/A VIDEO D/A P.C.B.

REF.NO.	NTSC	PAL
FL4001	VLF0902	VLF0904
	VEP84105A	VEP84105B

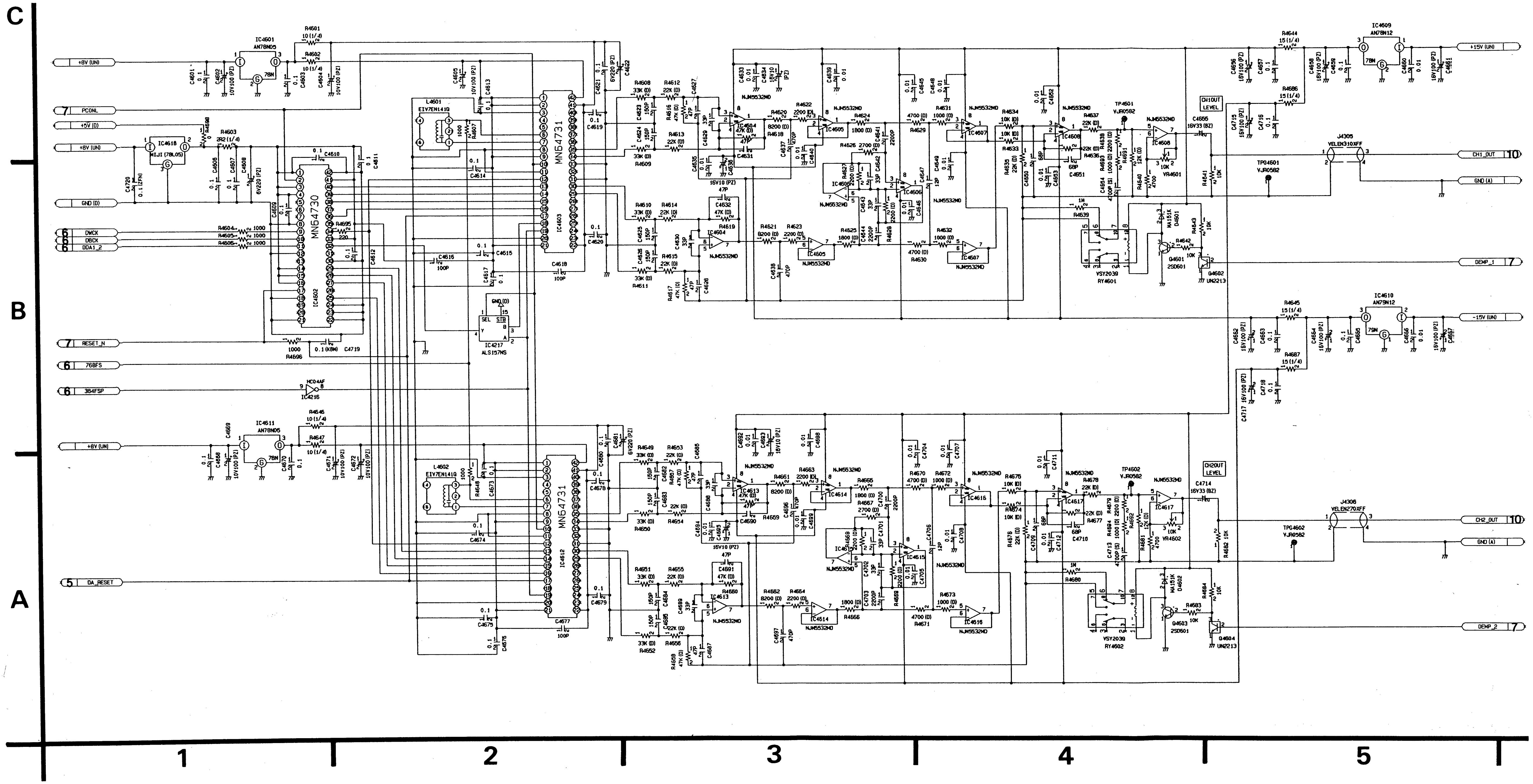


L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (2/10)

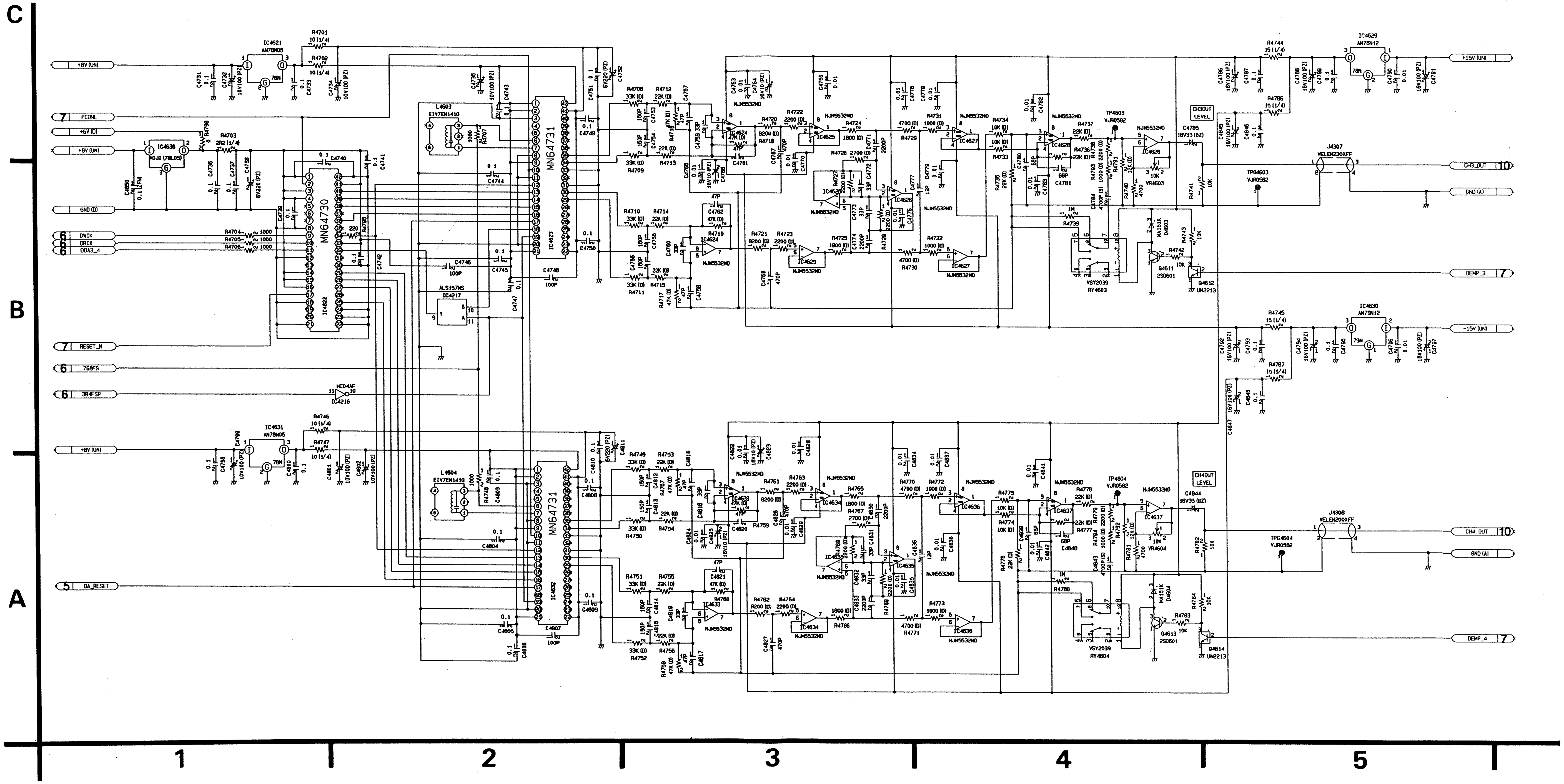


4—2—2

L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (3/10)

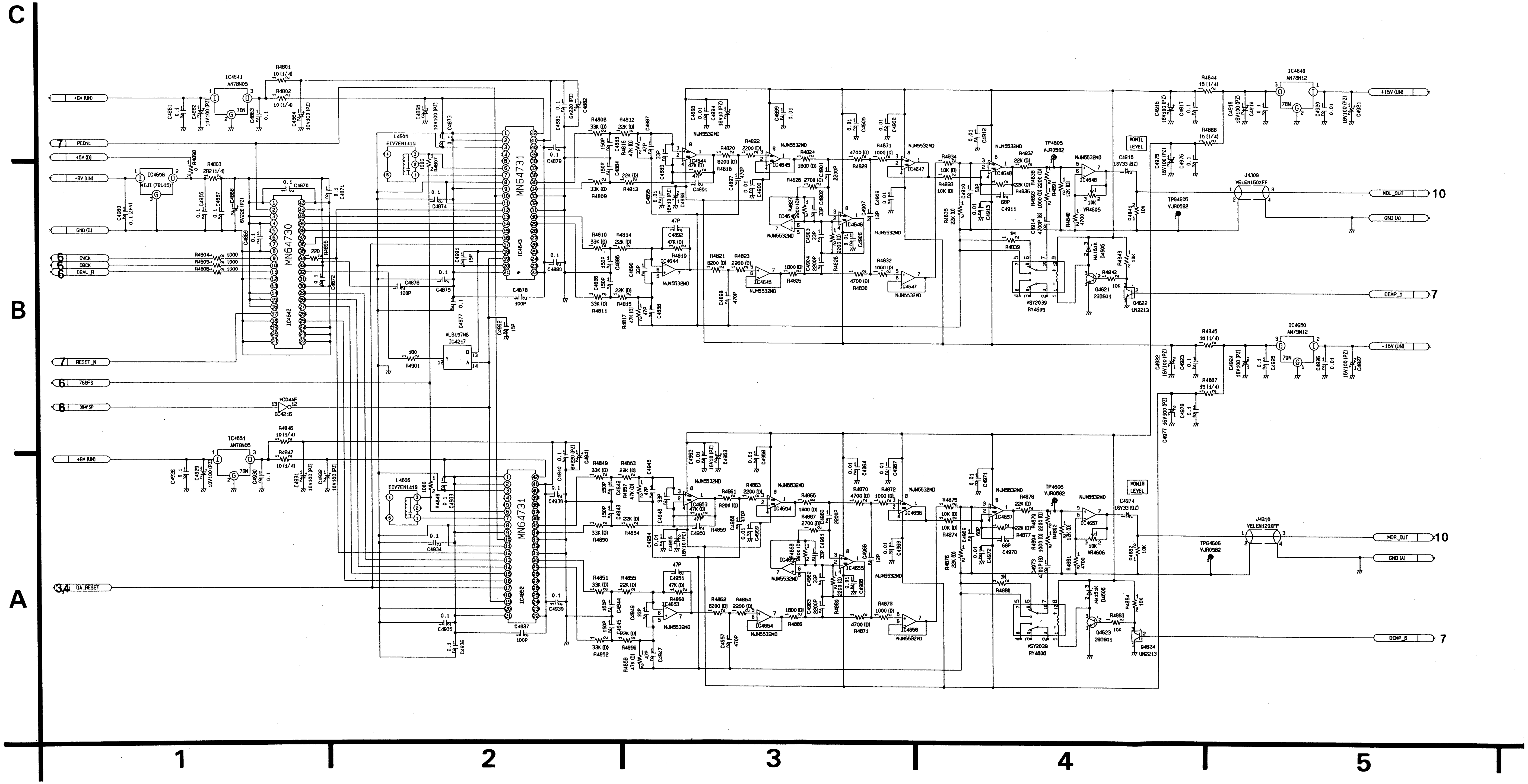


L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (4/10)



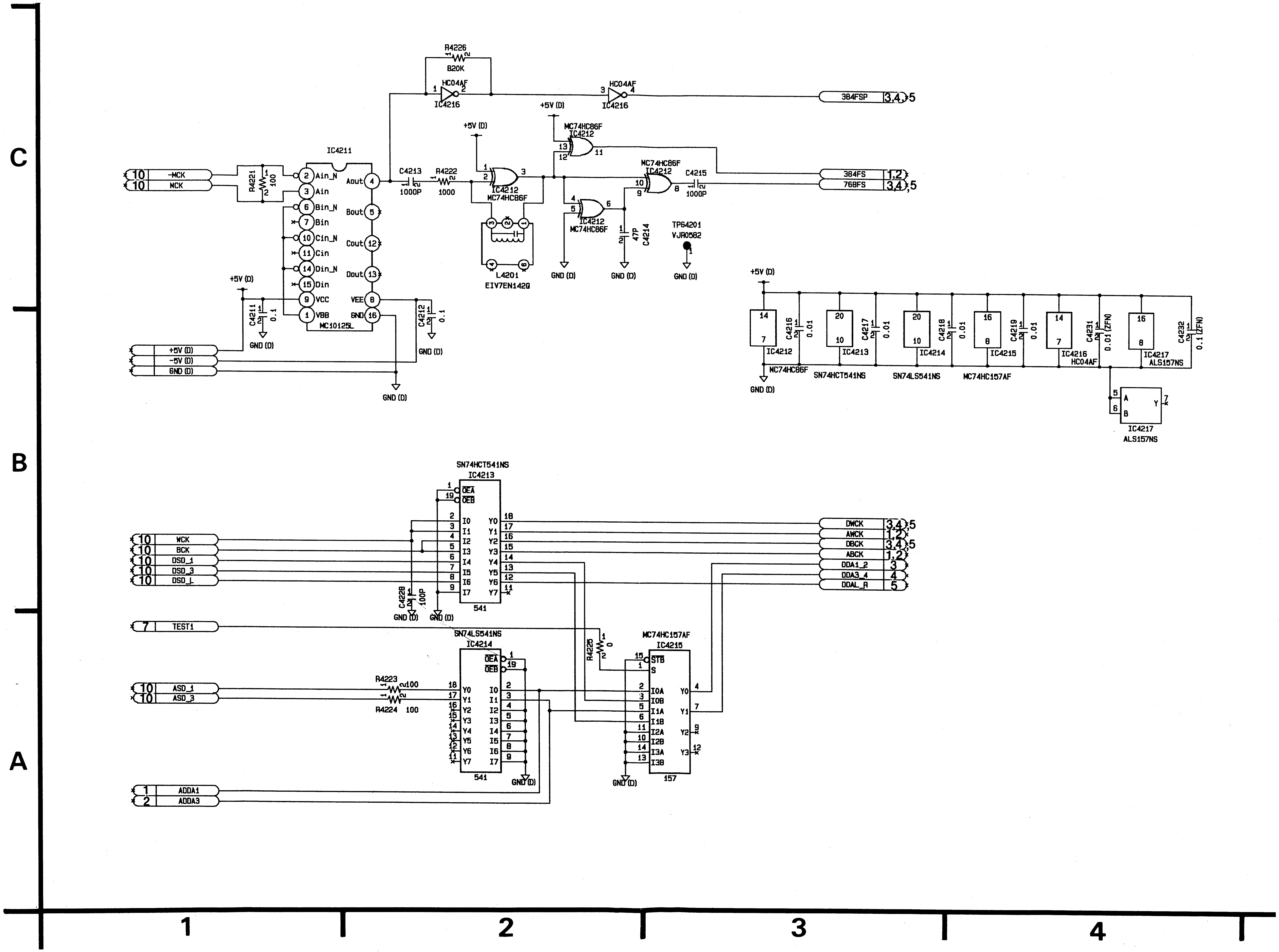
4—2—4

L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (5/10)

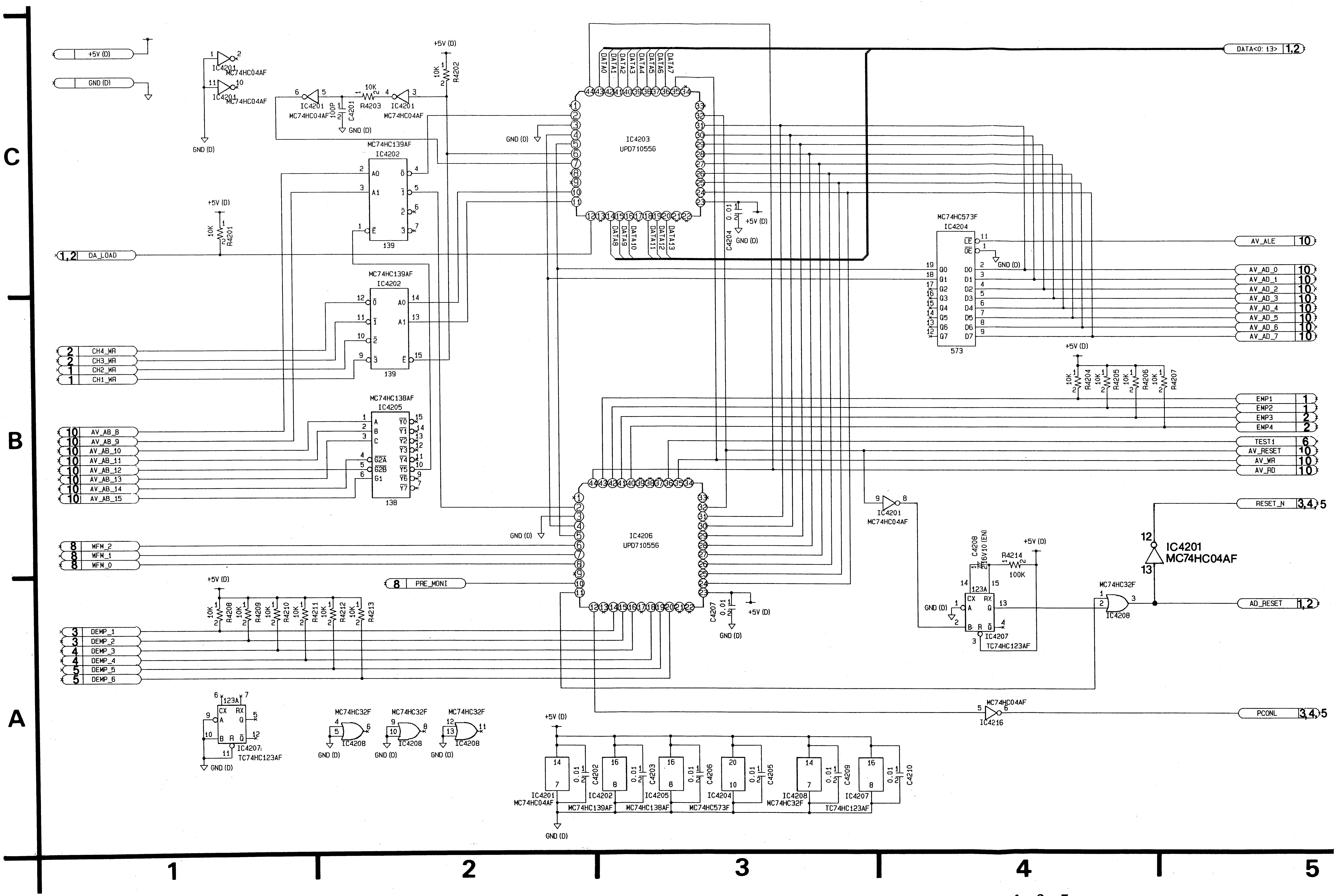


4—2—5

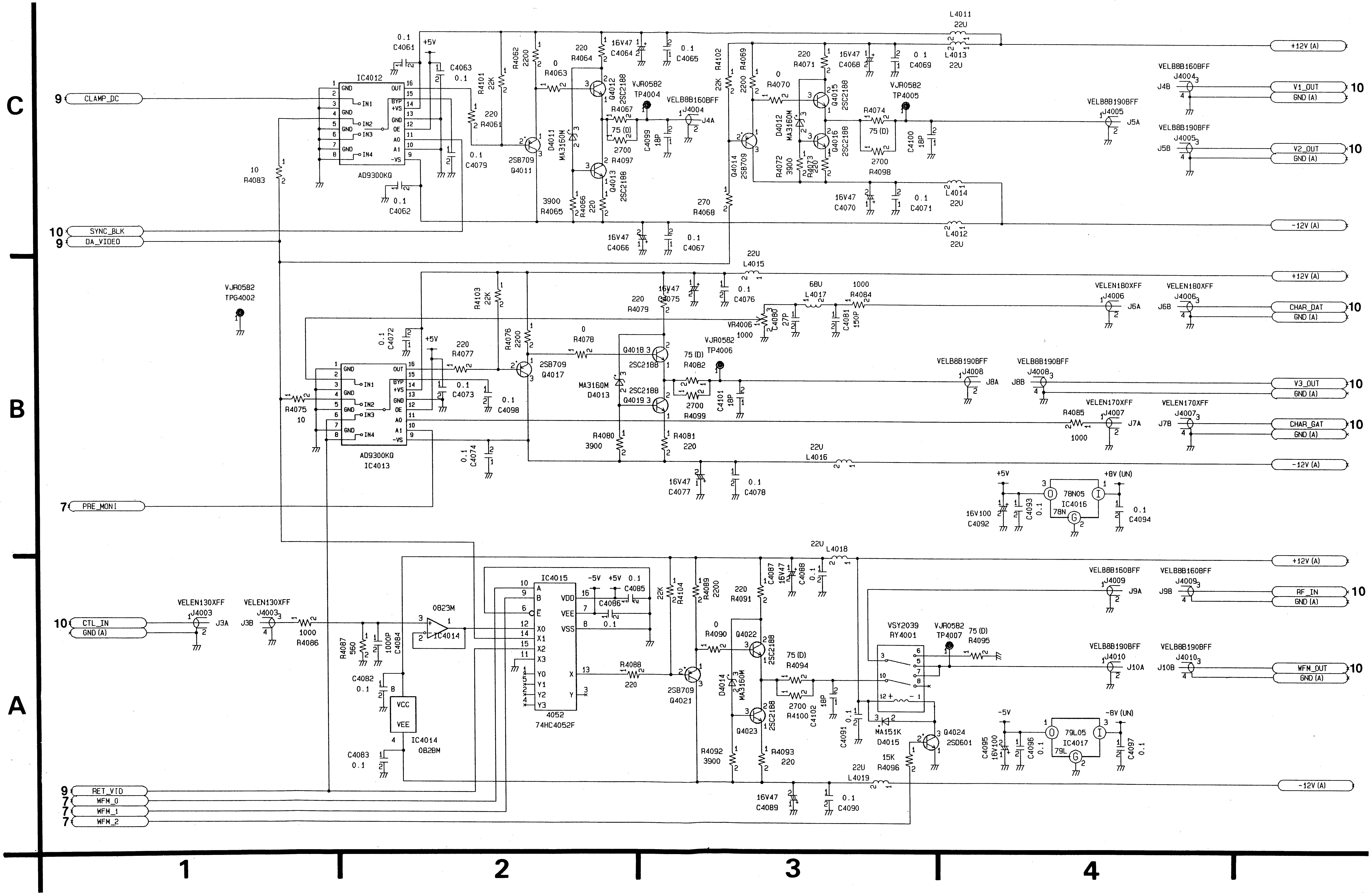
L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (6/10)



L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (7/10)

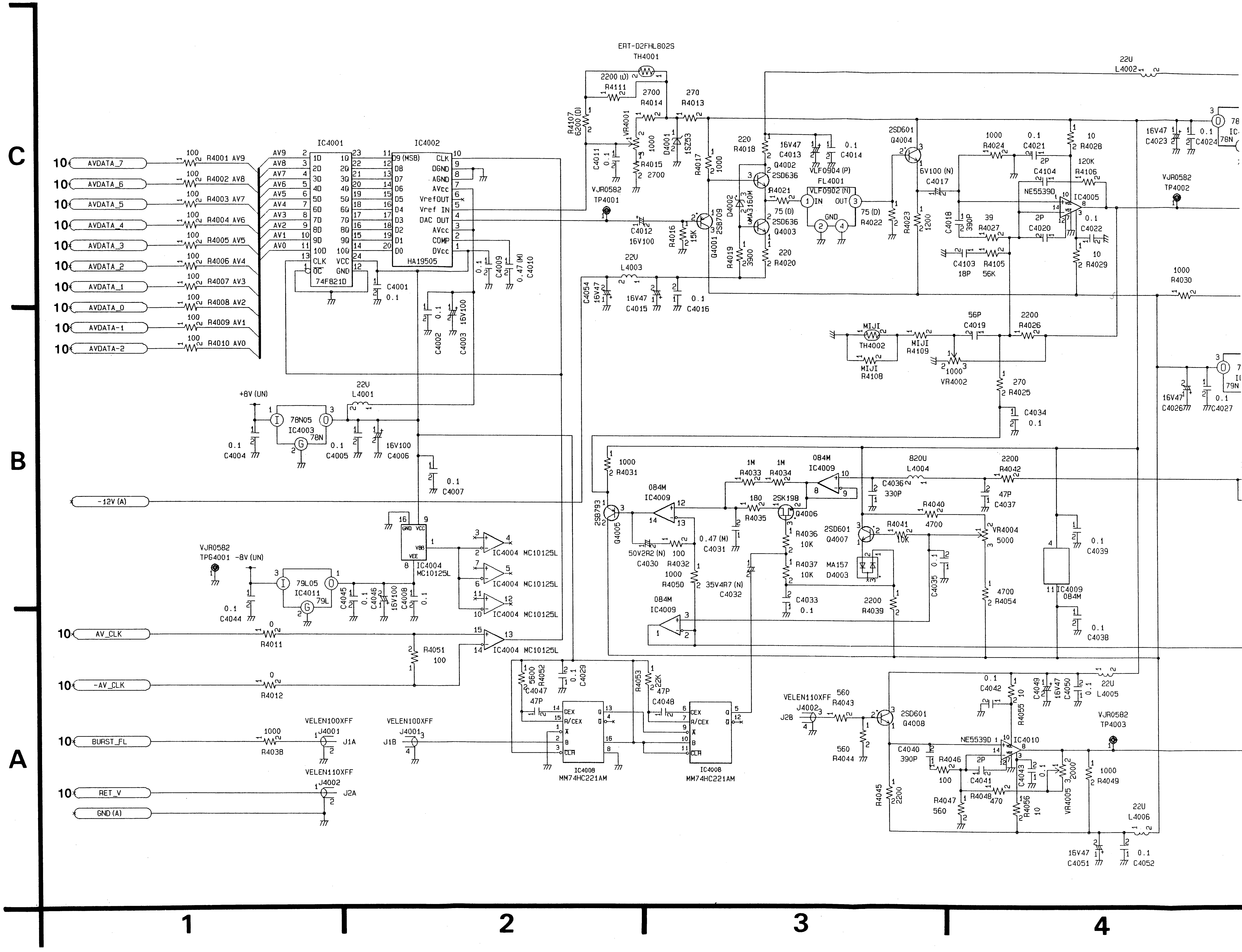


L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (8/10)

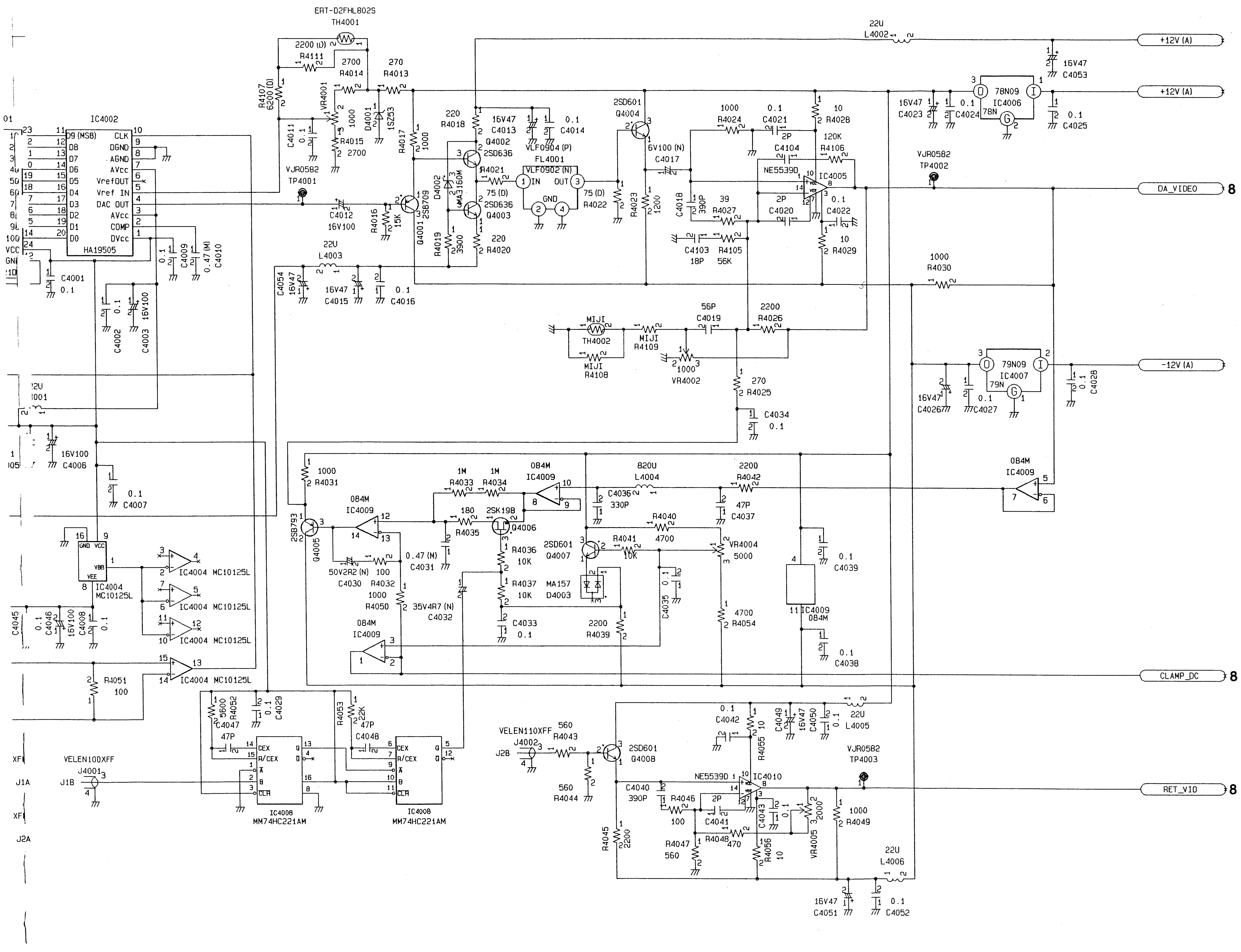


4—2—8

L1 AUDIO A/D, D/A/VIDEO D/A SCHEMATIC DIAGRAM (9/10)



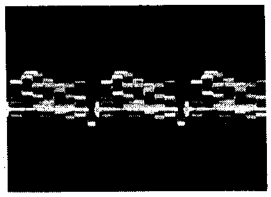
SCHEMATIC DIAGRAM (9/10)



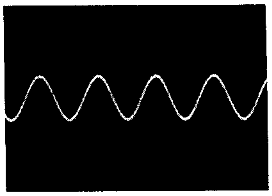
2 3 4 5

NTSC

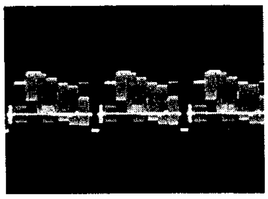
L1 WAVEFORMS NTSC



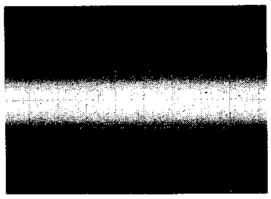
TP4001 E-E2
500mV/20μsec. div.



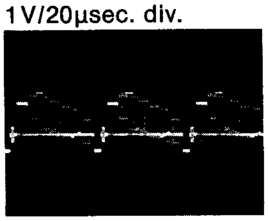
TP4304 E-E2
500mV/500μsec. div.



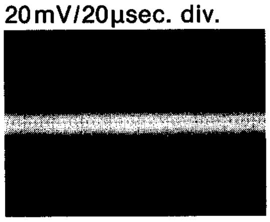
TP4002 E-E2
(TP4003, TP4004, TP4005, TP4007)
1V/20μsec. div.



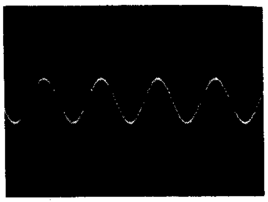
TP4311 E-E2
(TP4312, TP4313, TP4314, TP4315, TP4316)
20mV/20μsec. div.



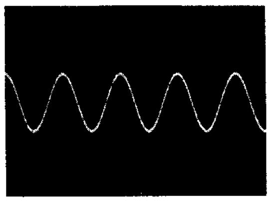
TP4006 E-E2
500mV/20μsec. div.



TP4603 E-E2
(TP4604)
20mV/500μsec. div.



TP4301 E-E2
500mV/500μsec. div.



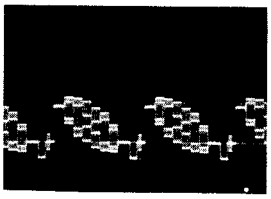
TP4605 E-E2
(TP4606)
200mV/500μsec. div.

TP4302 E-E2
(TP4305)
2V/500μsec. div.

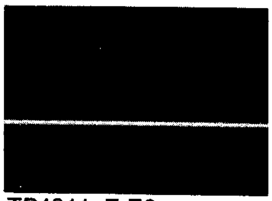
TP4303 E-E2
(TP4306, TP4601, TP4602)
200mV/500μsec. div.

PAL

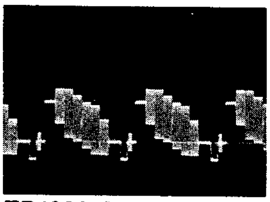
L1 WAVEFORMS PAL



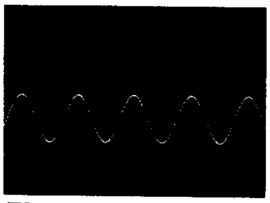
TP4001 E-E2
500mV/20μsec. div.



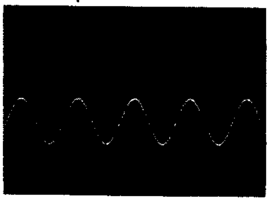
TP4311 E-E2
(TP4312, TP4313, TP4314, TP4315, TP4316)
20mV/20μsec. div.



TP4002 E-E2
(TP4003, TP4004, TP4005, TP4006, TP4007)
1V/20μsec. div.

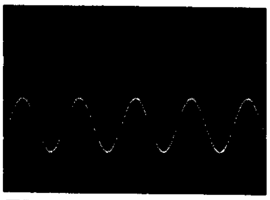


TP4601 E-E2
(TP4602−TP4606)
1V/500μsec. div.



TP4301 E-E2
(TP4304)
2V/500μsec. div.

TP4302 E-E2
(TP4305)
5V/500μsec. div.

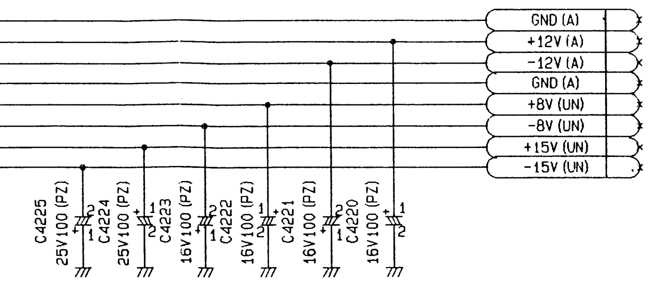


TP4303 E-E2
(TP4306)
1V/500μsec. div.

10/10) [L MOTHER (P001, P002) SCHEMATIC DIAGRAM (1/7) FOR L1]

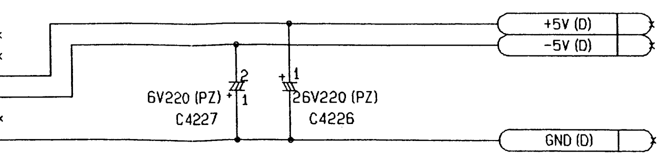
P001		L 1					
	B	FROM / TO					
1	GND (A)					GND (A)	
2	+12V (A)					+12V (A)	
3	-12V (A)					-12V (A)	
4	GND (A)					GND (A)	
5	+8V (un)					+8V (UN)	
6	-8V (un)					-8V (UN)	
7	+15V (un)					+15V (UN)	
8	-15V (un)					-15V (UN)	
9	GND (A)					GND (A)	
10	CH1 LINE IN C	P015-2				CH1_IN_C	1
11	CH2 LINE IN C	P015-5				CH2_IN_C	1
12	CH3 LINE IN C	P015-8				CH3_IN_C	2
13	CH4 LINE IN C	P015-11				CH4_IN_C	2
14	GND (A)					GND (A)	
15	CH2 LINE OUT	P010-3				CH2_OUT	3
16	CH2 LINE OUT GND	P010-4				GND (A)	
17	MONI L OUT	P010-9				MOL_OUT	5
18	MONI L OUT GND	P010-10				GND (A)	
19	GND (A)					GND (A)	
20							
21	AMCK	P003-21B				AMCK	6
22	$\overline{\text{AMCK}}$	P003-22B				AMCK_L	6
23	BCK	P003-23B	P019-28A			ABCK	6
24	AV AB 14	P003-24B	P005-24B	P007-24B	P024-15A	AV_AB_14	7
25	AV AB 11	P003-25B	P005-25B	P007-25B	P024-18A	AV_AB_11	7
26	AV AB 8	P003-26B	P005-26B	P007-26B	P024-21A	AV_AB_8	7
27	AV AD 5	P003-27B	P005-27B	P007-27B	P024-25A	AV_AD_5	7
28	AV AD 2	P003-28B	P005-28B	P007-28B	P024-28A	AV_AD_2	7
29	AV ALE	P003-29B	P005-29B	P007-29B	P024-22A	AV_ALE	7
30	AV RESET	P003-30B	P005-30B	P007-30B	P024-9A	AV_RESET	7
31							
32	GND (D)					GND (D)	

P001		L 1					
	C	FROM / TO					
1	GND (A)					GND (A)	
2	+12V (A)					+12V (A)	
3	-12V (A)					-12V (A)	
4	GND (A)					GND (A)	
5	+8V (un)					+8V (UN)	
6	-8V (un)					-8V (UN)	
7	+15V (un)					+15V (UN)	
8	-15V (un)					-15V (UN)	
9	GND (A)					GND (A)	
10	CH1 LINE IN H	P015-1				CH1_IN_H	1
11	CH2 LINE IN H	P015-4				CH2_IN_H	1
12	CH3 LINE IN H	P015-7				CH3_IN_H	2
13	CH4 LINE IN H	P015-10				CH4_IN_H	2
14	GND (A)					GND (A)	
15	CH3 LINE OUT	P010-5				CH3_OUT	4
16	CH3 LINE OUT GND	P010-6				GND (A)	
17	MONI R OUT	P010-11				MOR_OUT	5
18	MONI R OUT GND	P010-12				GND (A)	
19	GND (A)					GND (A)	
20							
21							
22							
23	WCK	P003-21C	P019-27A			AWCK	6
24	AV AB 15	P003-24C	P005-24C	P007-24C	P024-14A	AV_AB_15	7
25	AV AB 12	P003-25C	P005-25C	P007-25C	P024-17A	AV_AB_12	7
26	AV AB 9	P003-26C	P005-26C	P007-26C	P024-20A	AV_AB_9	7
27	AV AD 6	P003-27C	P005-27C	P007-27C	P024-24A	AV_AD_6	7
28	AV AD 3	P003-28C	P005-28C	P007-28C	P024-27A	AV_AD_3	7
29	AV AD 0	P003-29C	P005-29C	P007-29C	P024-30A	AV_AD_0	7
30	AV WR	P003-30C	P005-30C	P007-30C	P024-11A	AV_WR	7
31							
32	GND (D)					GND (D)	



P002		L 1					
	B	FROM / TO					
1	GND (D)					GND (D)	
2							
3	DSD L	P024-26B				DSD_L	6
4							
5							
6							
7							
8							
9							
10							
11	AV DATA 6	P008-11B				AVDATA_6	9
12	AV DATA 3	P008-12B				AVDATA_3	9
13	AV DATA 0	P008-13B				AVDATA_0	9
14	$\overline{\text{AV CLK}}$ 0	P008-14B				AV_CLK_L	9
15	GND (A)					GND (A)	
16	RF WFM	P012-3				RF_IN	8
17	RF WFM GND	P012-4				GND (A)	
18	VIDEO 2 OUT	P014-3				V2_OUT	8
19	VIDEO 2 OUT GND	P014-4				GND (A)	
20	CHAR SIG	P019-12A				CHAR_DAT	8
21						GND (A)	
22						GND (A)	
23							
24							
25							
26							
27	GND (D)					GND (D)	
28	+5V (D)					+5V (D)	
29	+5V (D)					+5V (D)	
30	-5V (D)					-5V (D)	
31	GND (D)					GND (D)	
32	GND (D)					GND (D)	

P002		L 1					
	C	FROM / TO					
1	GND (D)					GND (D)	
2	DSD 3	P024-27B				DSD_3	6
3							
4	ASD 3	P024-29B				ASD_3	6
5							
6							
7							
8							
9	SYNC BLNK	P008-9C				SYNC_BLK	8
10	BURST FLAG	P008-10C				BURST_FL	9
11	AV DATA 7	P008-11C				AVDATA_7	9
12	AV DATA 4	P008-12C				AVDATA_4	9
13	AV DATA 1	P008-13C				AVDATA_1	9
14	AV DATA -2	P008-14C				AVDATA-2	9
15	GND (A)					GND (A)	
16	WF CTL	P012-5				CTL_IN	8
17	WF CTL GND	P012-6				GND (A)	
18	VIDEO 3 OUT	P014-5				V3_OUT	8
19	VIDEO 3 OUT GND	P014-6				GND (A)	
20	CHAR GATE	P019-11A				CHAR_GAT	8
21						GND (A)	
22						GND (A)	
23							
24							
25							
26							
27	GND (D)					GND (D)	
28	+5V (D)					+5V (D)	
29	+5V (D)						
30	-5V (D)						
31	GND (D)					GND (D)	
32	GND (D)						



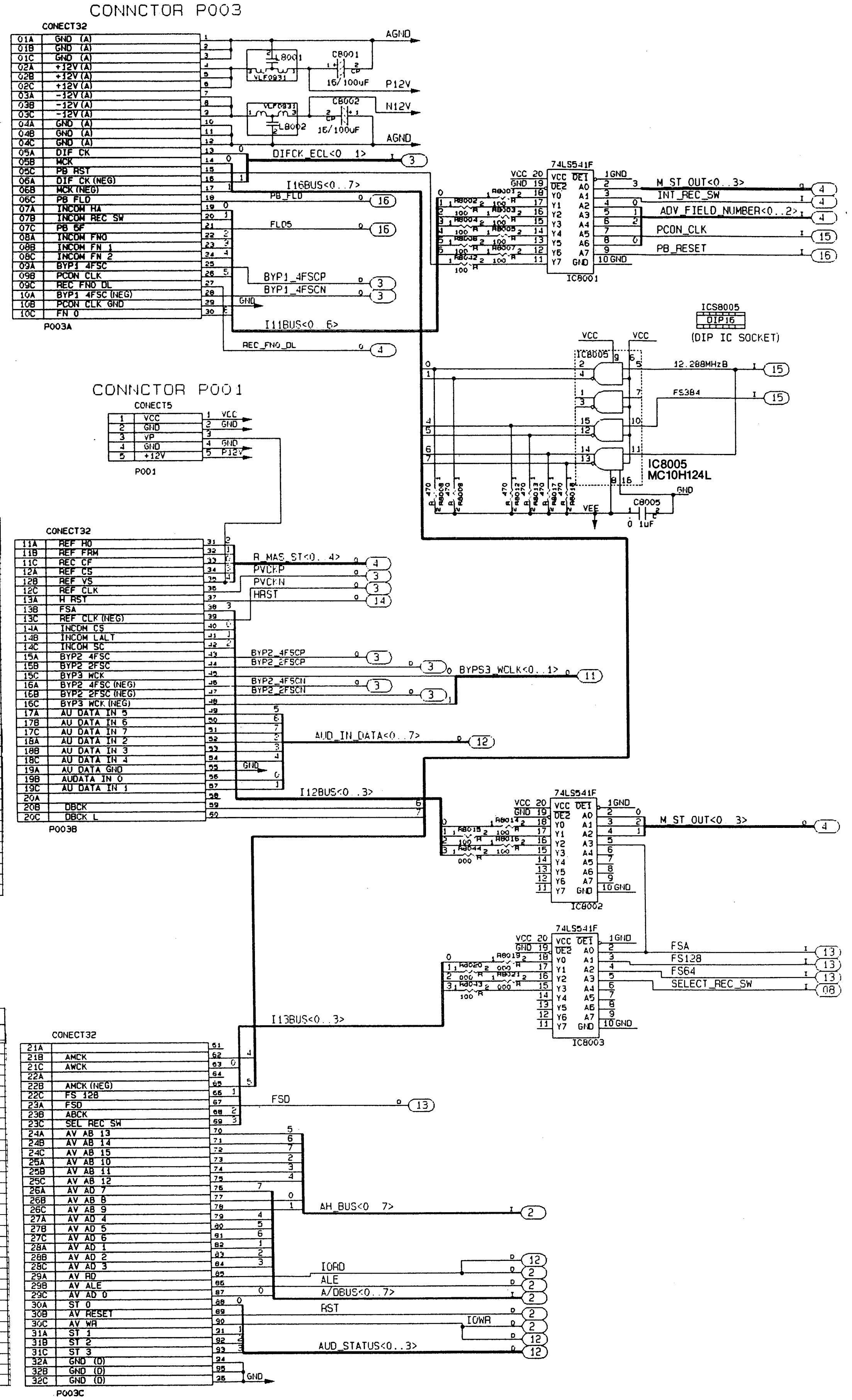
3	4	5	6	7

L2 VIDEO/AUDIO REC (CONNECTOR) SCHEMATIC DIAGRAM (1/19) [L MOTHER (P003, P004) SCHEMATIC DIAGRAM (2/7) FOR L2]

P003		L 2			
	A	FROM / TO			
1	GND (A)				
2	+12V (A)				
3	-12V (A)				
4	GND (A)				
5	DIF CK	P032-1			
6	DIF CK	P032-2			
7	INCOM HR	P007-7A			
8	INCOM FN0	P007-8A			
9	BYP1 4FSC	P007-9A			
10	BYP1 4FSC	P007-10A			
11	REF HO	P007-11A			
12	REF CS	P007-12A			
13	H RST	P007-13A			
14	INCOM CS	P007-14A			
15	BYP2 4FSC	P005-15A			
16	BYP2 4FSC	P005-16A			
17	AU DATA IN 5	P006-12C	P024-11B		
18	AU DATA IN 2	P006-11C	P024-14B		
19	AU DATA GND	P006-13C			
20					
21					
22					
23	FSD	P019-22A			
24	AV AB 13	P001-24A	P005-24A	P007-24A	P024-16A
25	AV AB 10	P001-25A	P005-25A	P007-25A	P024-19A
26	AV AD 7	P001-26A	P005-26A	P007-26A	P024-23A
27	AV AD 4	P001-27A	P005-27A	P007-27A	P024-26A
28	AV AD 1	P001-28A	P005-28A	P007-28A	P024-29A
29	AV RD	P001-29A	P005-29A	P007-29A	P024-12A
30	ST 0	P019-26A			
31	ST 1	P019-25A			
32	GND (D)				

P003		L 2			
	B	FROM / TO			
1	GND (A)				
2	+12V (A)				
3	-12V (A)				
4	GND (A)				
5	MCK	P005-5B			
6	MCK	P005-6B			
7	INCOM REC SW	P007-7B			
8	INCOM FN 1	P007-8B			
9	PCON CLK	P007-9B	P005-13B		
10	PCON CLK GND	P007-10B	P005-14B		
11	REF FRM	P007-11B			
12	REF VS	P007-12B			
13	FSA	P019-21A			
14	INCOM LALT	P007-14B			
15	BYP2 2FSC	P005-15B			
16	BYP2 2FSC	P005-16B			
17	AU DATA IN 6	P006-13A	P024-10B		
18	AU DATA IN 3	P006-12A	P024-13B		
19	AU DATA IN 0	P006-11A	P024-16B		
20	DBCK	P032-4			
21	AMCK	P001-21B			
22	AMCK	P001-22B			
23	BCK	P001-23B	P019-28A		
24	AV AB 14	P001-24B	P005-24B	P007-24B	P024-15A
25	AV AB 11	P001-25B	P005-25B	P007-25B	P024-18A
26	AV AB 8	P001-26B	P005-26B	P007-26B	P024-21A
27	AV AD 5	P001-27B	P005-27B	P007-27B	P024-25A
28	AV AD 2	P001-28B	P005-28B	P007-28B	P024-28A
29	AV ALE	P001-29B	P005-29B	P007-29B	P024-22A
30	AV RESET	P001-30B	P005-30B	P007-30B	P024-9A
31	ST 2	P019-24A			
32	GND (D)				

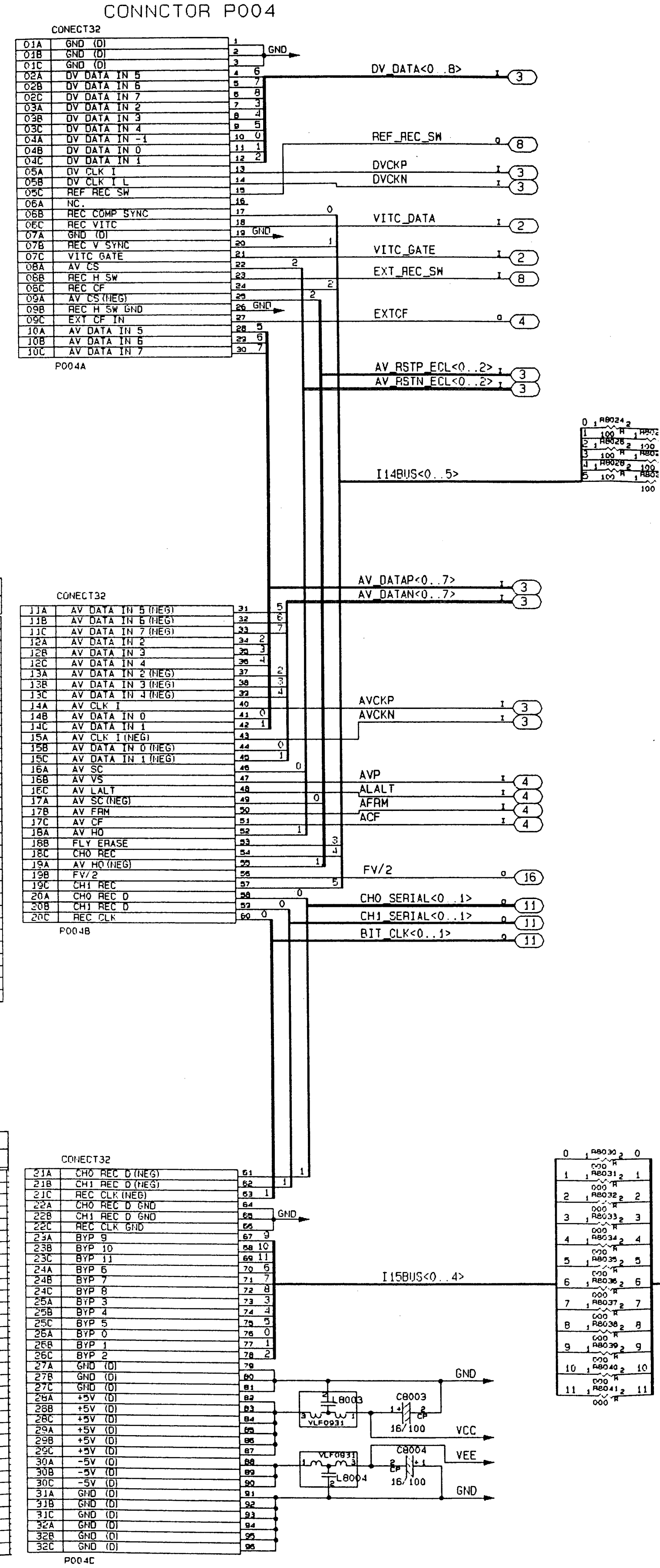
P003		L 2			
	C	FROM / TO			
1	GND (A)				
2	+12V (A)				
3	-12V (A)				
4	GND (A)				
5	PB RST	P005-5C	P019-30A		
6	PB FN0	P005-6C			
7	PB 5F	P005-7C	P024-18B		
8	INCOM FN 2	P007-8C			
9	REC FN0 DL	P006-9C			
10	REC FN 0	P005-10C			
11	REC CF	P007-11C			
12	REF CLK	P007-12C			
13	REF CLK	P007-13C			
14	INCOM SC	P007-14C			
15	BYP3 WCK	P005-15C			
16	BYP3 WCK	P005-16C			
17	AU DATA IN 7	P006-13B	P024-9B		
18	AU DATA IN 4	P006-12B	P024-12B		
19	AU DATA IN 1	P006-11B	P024-15B		
20	DBCK	P032-5			
21	WCK	P001-23C	P019-27A		
22	FS 128	P019-29A			
23	SEL REC SW	P005-23C			
24	AV AB 15	P001-24C	P005-24C	P007-24C	P024-14A
25	AV AB 12	P001-25C	P005-25C	P007-25C	P024-17A
26	AV AB 9	P001-26C	P005-26C	P007-26C	P024-20A
27	AV AD 6	P001-27C	P005-27C	P007-27C	P024-24A
28	AV AD 3	P001-28C	P005-28C	P007-28C	P024-27A
29	AV AD 0	P001-29C	P005-29C	P007-29C	P024-30A
30	AV WR	P001-30C	P005-30C	P007-30C	P024-11A
31	ST 3	P019-23A			
32	GND (D)				



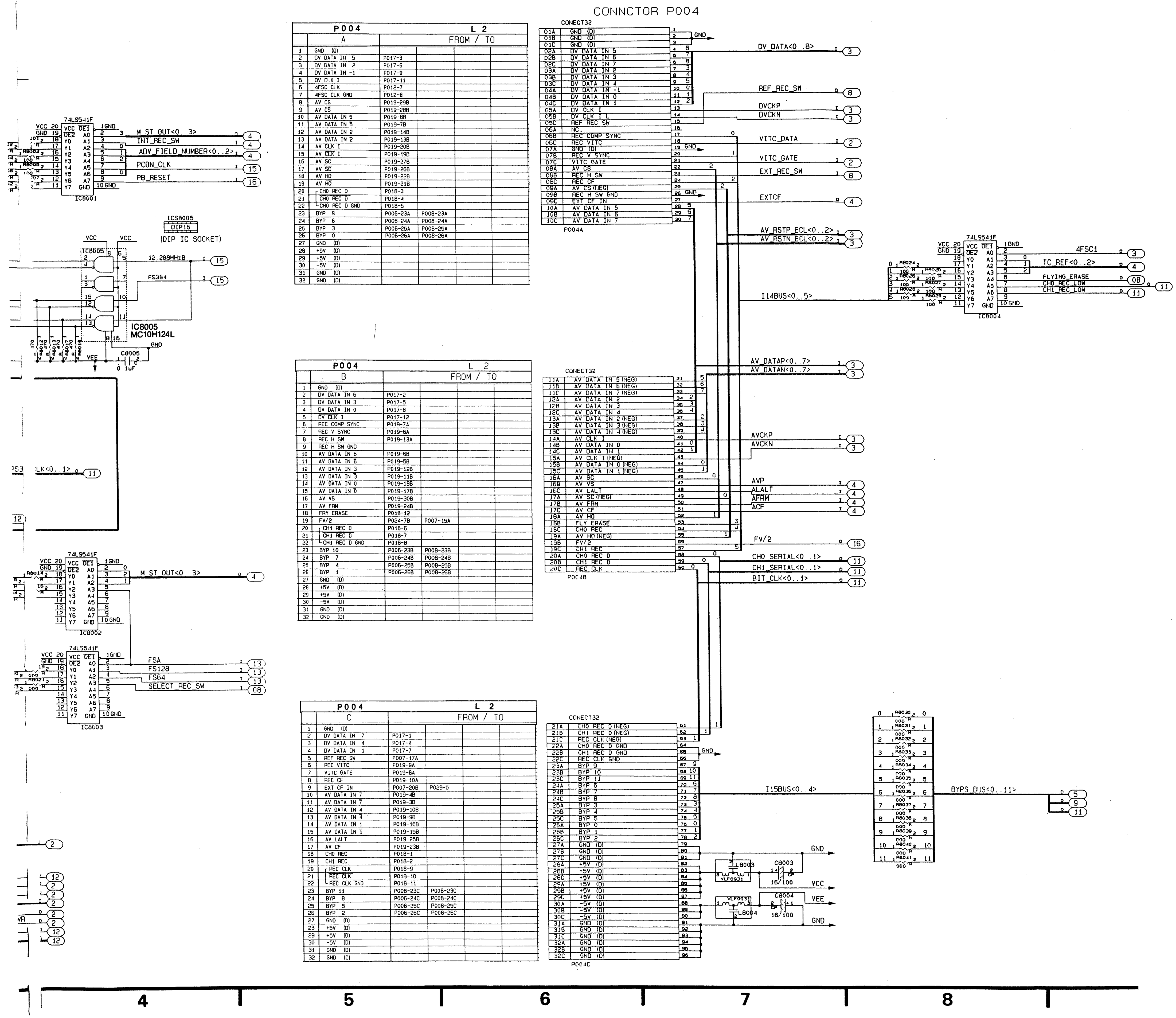
P004		L 2			
	A	FROM / TO			
1	GND (D)				
2	DV DATA IN 5	P017-3			
3	DV DATA IN 2	P017-6			
4	DV DATA IN -1	P017-9			
5	DV CLK I	P017-11			
6	4FSC CLK	P012-7			
7	4FSC CLK GND	P012-8			
8	AV CS	P019-29B			
9	AV CS	P019-28B			
10	AV DATA IN 5	P019-8B			
11	AV DATA IN 5	P019-7B			
12	AV DATA IN 2	P019-14B			
13	AV DATA IN 2	P019-13B			
14	AV CLK I	P019-20B			
15	AV CLK I	P019-19B			
16	AV SC	P019-27B			
17	AV SC	P019-26B			
18	AV HO	P019-22B			
19	AV HO	P019-21B			
20	CH0 REC D	P018-3			
21	CH0 REC D	P018-4			
22	CH0 REC D GND	P018-5			
23	BYP 9	P006-23A	P008-23A		
24	BYP 6	P006-24A	P008-24A		
25	BYP 3	P006-25A	P008-25A		
26	BYP 0	P006-26A	P008-26A		
27	GND (D)				
28	+5V (D)				
29	+5V (D)				
30	-5V (D)				
31	GND (D)				
32	GND (D)				

P004		L 2			
	B	FROM / TO			
1	GND (D)				
2	DV DATA IN 6	P017-2			
3	DV DATA IN 3	P017-5			
4	DV DATA IN 0	P017-8			
5	DV CLK I	P017-12			
6	REC COMP SYNC	P019-7A			
7	REC V SYNC	P019-6A			
8	REC H SW	P019-13A			
9	REC H SW GND				
10	AV DATA IN 6	P019-6B			
11	AV DATA IN 6	P019-5B			
12	AV DATA IN 3	P019-12B			
13	AV DATA IN 3	P019-11B			
14	AV DATA IN 0	P019-18B			
15	AV DATA IN 0	P019-17B			
16	AV VS	P019-30B			
17	AV FRM	P019-24B			
18	FRY ERASE	P018-12			
19	FV/2	P024-7B	P007-15A		
20	CH1 REC D	P018-6			
21	CH1 REC D	P018-7			
22	CH1 REC D GND	P018-8			
23	BYP 10	P006-23B	P008-23B		
24	BYP 7	P006-24B	P008-24B		
25	BYP 4	P006-25B	P008-25B		
26	BYP 1	P006-26B	P008-26B		
27	GND (D)				
28	+5V (D)				
29	+5V (D)				
30	-5V (D)				
31	GND (D)				
32	GND (D)				

P004		L 2			
	C	FROM / TO			
1	GND (D)				
2	DV DATA IN 7	P017-1			
3	DV DATA IN 4	P017-4			
4	DV DATA IN 1	P017-7			
5	REF REC SW	P007-17A			
6	REC VITC	P019-9A			
7	VITC GATE	P019-8A			
8	REC CF	P019-10A			
9	EXT CF IN	P007-20B	P029-5		
10	AV DATA IN 7	P019-4B			
11	AV DATA IN 7	P019-3B			
12	AV DATA IN 4	P019-10B			
13	AV DATA IN 4	P019-9B			
14	AV DATA IN 1	P019-16B			
15	AV DATA IN 1	P019-15B			
16	AV LALT	P019-25B			
17	AV CF	P019-23B			
18	CH0 REC	P018-1			
19	CH1 REC	P018-2			
20	REC CLK	P018-9			
21	REC CLK	P018-10			
22	REC CLK GND	P018-11			
23	BYP 11	P006-23C	P008-23C		
24	BYP 8	P006-24C	P008-24C		
25	BYP 5	P006-25C	P008-25C		
26	BYP 2	P006-26C	P008-26C		
27	GND (D)				
28	+5V (D)				
29	+5V (D)				
30	-5V (D)				
31	GND (D)				
32	GND (D)				



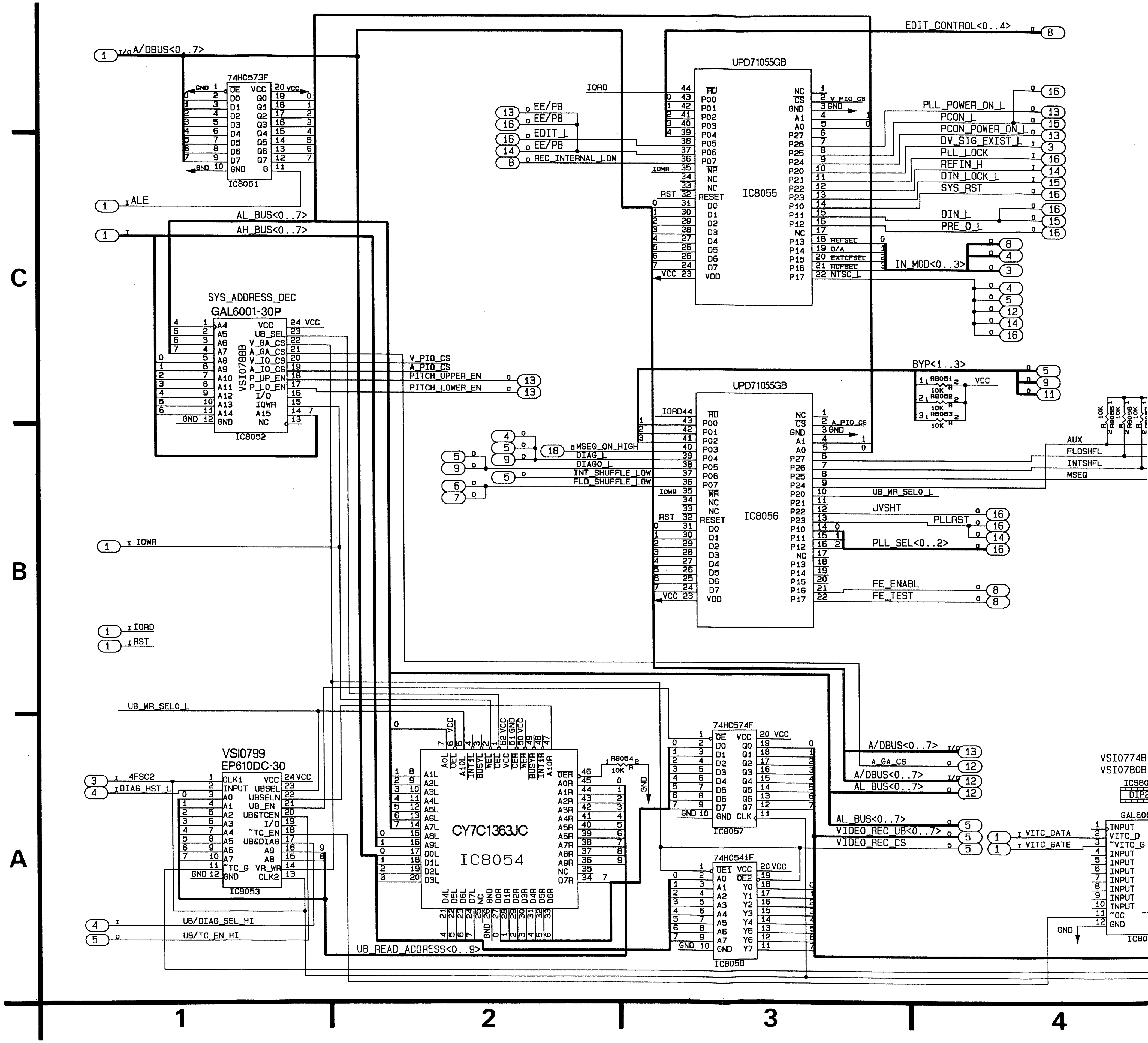
AGRAM (1/19) [L MOTHER (P003, P004) SCHEMATIC DIAGRAM (2/7) FOR L2]



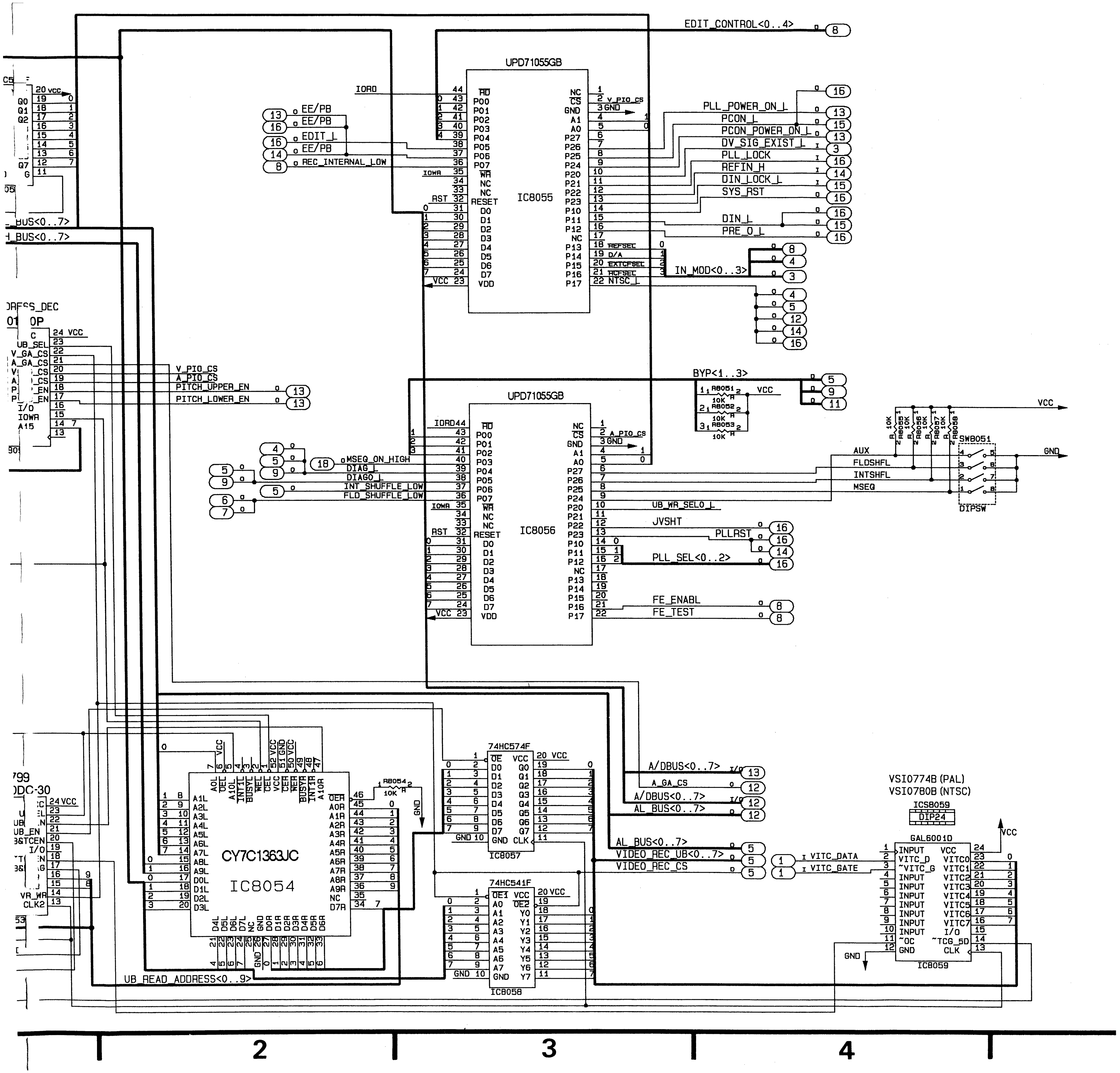
COMPARISON CHART BETWEEN
NTSC MODEL AND PAL MODEL
L2 VIDEO/AUDIO REC P.C.B.

REF. NO.	NTSC	PAL
IC8059	VSI0780B	VSI0774B
IC8114	VSI0951B	VSI0950B
IC8152	VSI0953	VSI0952B
IC8154	VSI0797	VSI0796A
IC8351	VSI0775B	VSI0769B
IC8352	VSI0792	VSI0790
IC8353	VSI0791	VSI0789
IC8357	VSI0777B	VSI0771B
IC8358	VSI0776B	VSI0770B
IC8360	VSI0778B	VSI0772B
IC8362	VSI0778B	VSI0772B
IC8503	VSI0779B	VSI0773B
IC8509	VSX0468	VSX0467
IC8751	VSI0934B	VSI0933A
IC8752	VSI0936A	VSI0935A
IC8753	VSI0938D	VSI0937D
	VEP88072C	VEP88072D

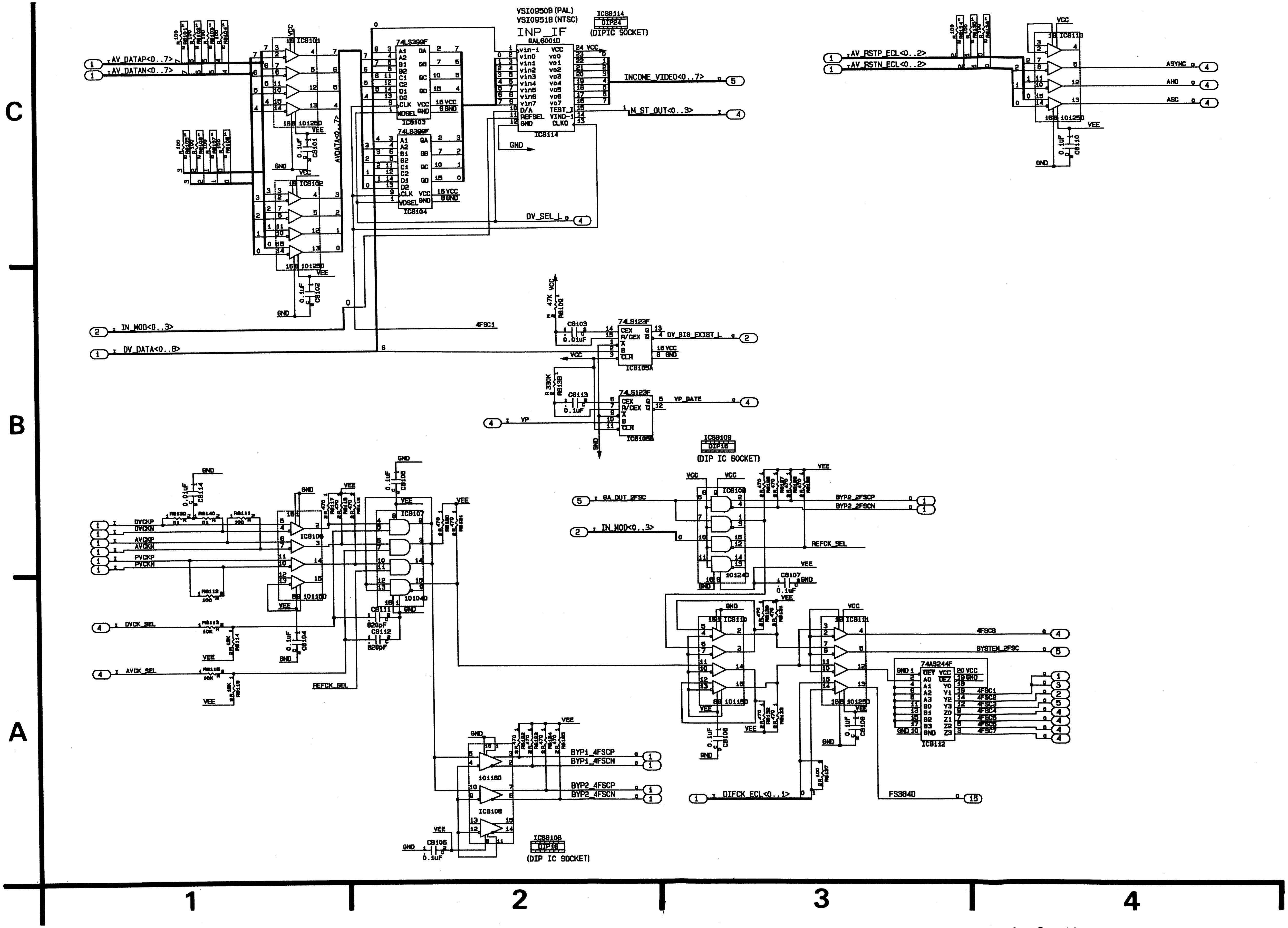
L2 VIDEO/AUDIO REC (SYS IF) SCHEMATIC DIAGRAM (2/19)



(SYS IF) SCHEMATIC DIAGRAM (2/19)

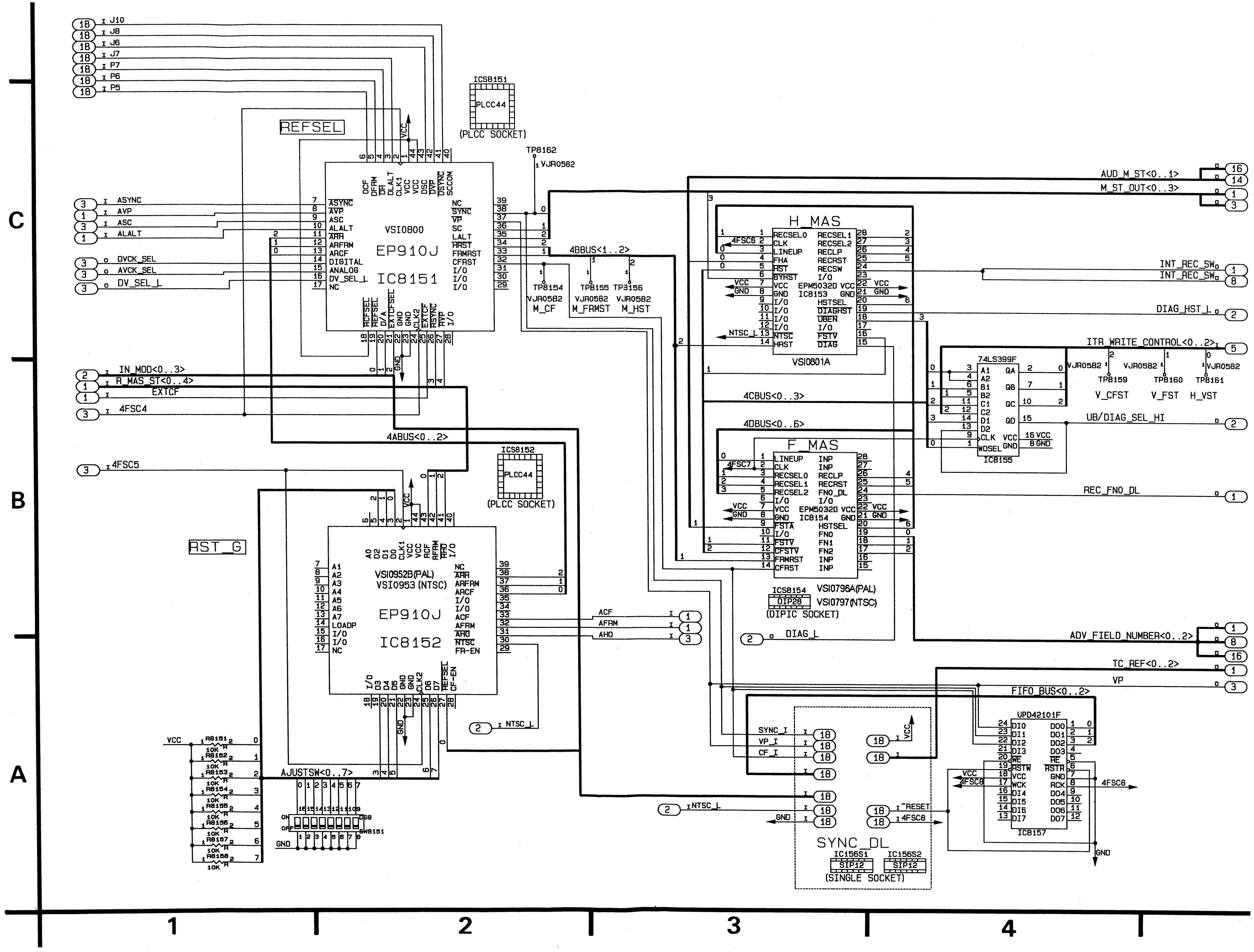


L2 VIDEO/AUDIO REC (INPUT IF) SCHEMATIC DIAGRAM (3/19)

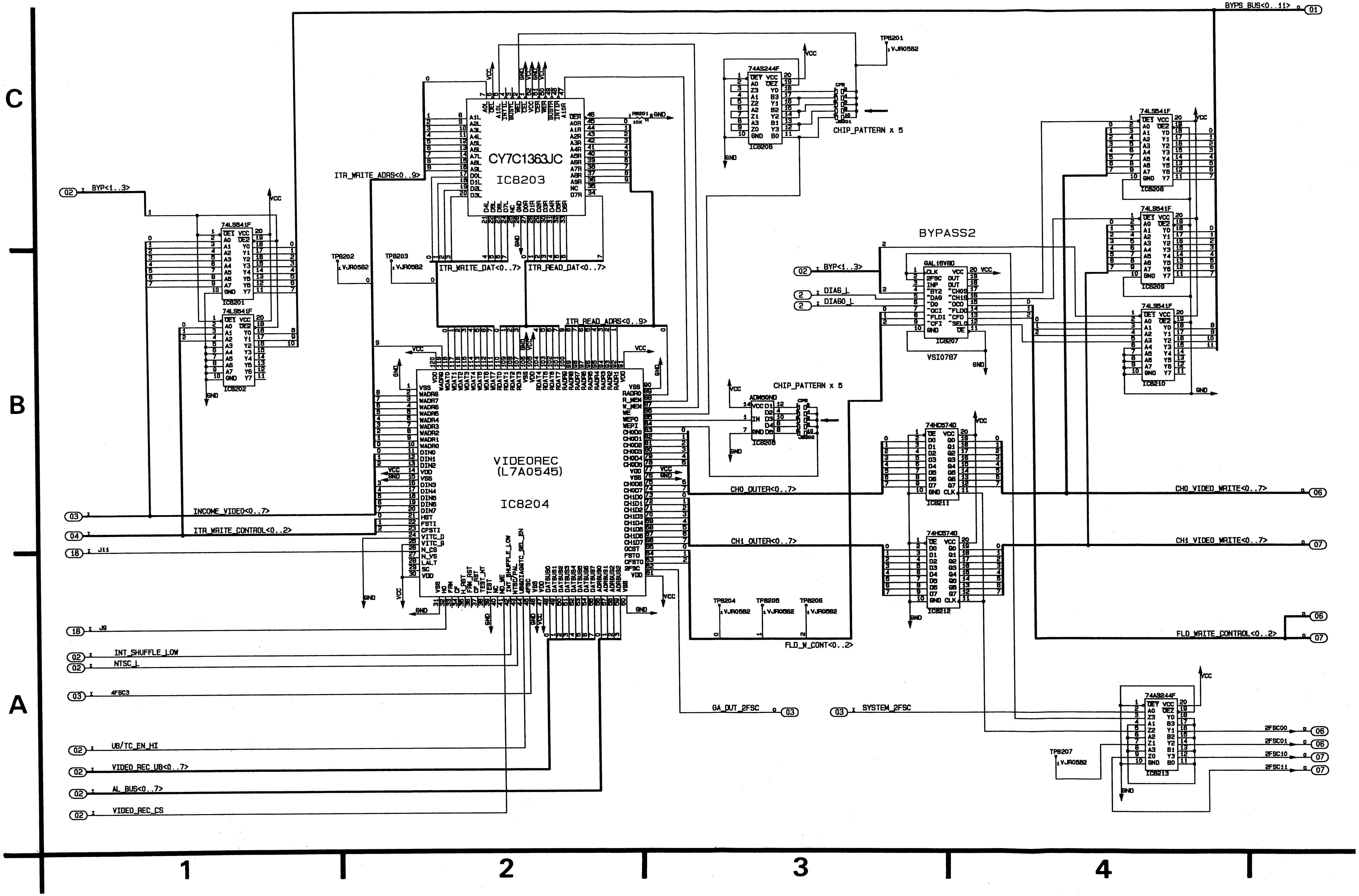


4—2—13

L2 VIDEO/AUDIO REC (MASTER COUNTER) SCHEMATIC DIAGRAM (4/19)

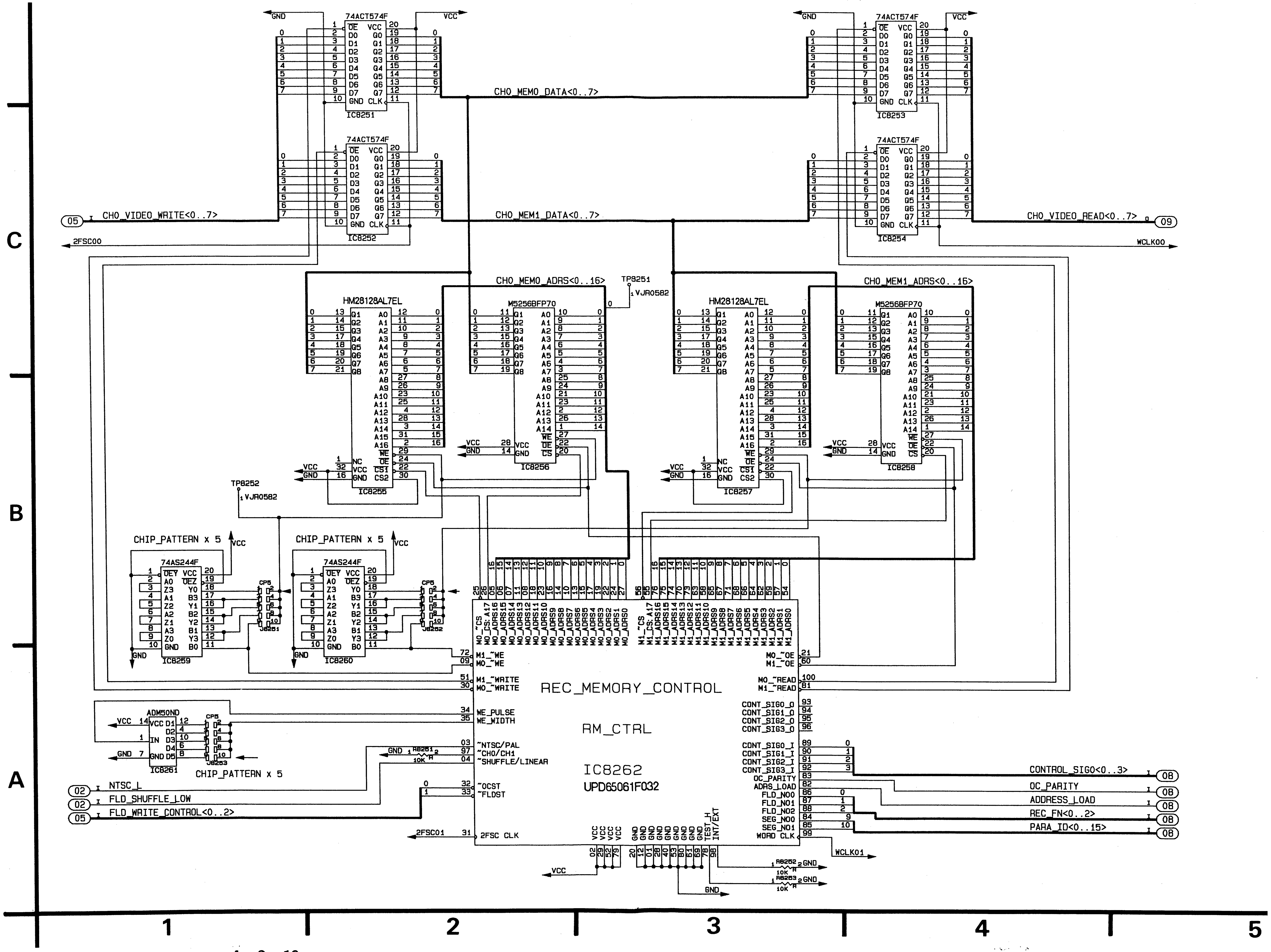


L2 VIDEO/AUDIO REC (INTRA-SHUFFLE & OUTER ENCODE) SCHEMATIC DIAGRAM (5/19)

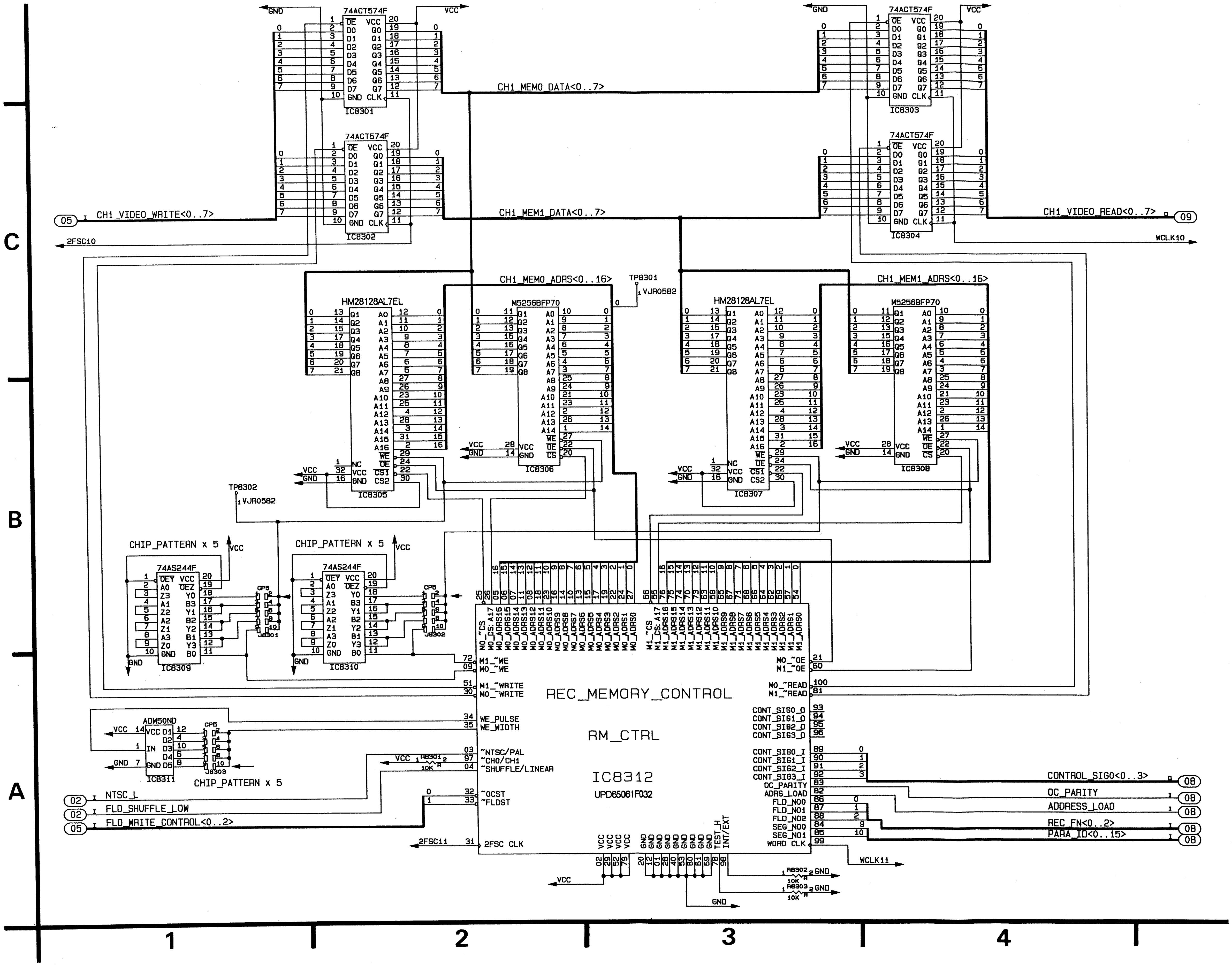


4—2—15

L2 VIDEO/AUDIO REC (CH0 SHUFFLING MEMORY) SCHEMATIC DIAGRAM (6/19)



L2 VIDEO/AUDIO REC (CH1 SHUFFLING MEMORY) SCHEMATIC DIAGRAM (7/19)



4—2—17

L2 VIDEO/AUDIO REC (CHANNEL CONTROL & ID GEN) SCHEMATIC DIAGRAM (8/19)